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IMPORTANT ORDERS FOR FORE RIVER COMPANY.

A contract for building two new steel steamers of the most modern type and perfect equipment for the Fall River Line's Long Island sound traffic has been awarded to the Fore River Ship & Engine Co. of Quincy, Mass. One boat is for the passenger service and will cost about $1,000,000 to build; the other is a $450,000 freighter. The lines and arrangement of the passenger steamer are patterned, in a general way, after those of the Puritan of the present fleet, while the freighter is to resemble the City of Taunton to a similar degree.

The new passenger steamer will be a side-wheeler with paddle-boxes built into the superstructure. She will be 397 ft. long overall, 378 ft. 6 in. long on the waterline, with 50 ft. molded beam and 21 ft. moulded depth, and will measure 88 ft. in breadth over the guards at the widest part. She will have a double hull to the waterline, bracket-plated on the longitudinal system, and divided by watertight bulkheads into thirteen compartments. Above the double bottom, which is 3 ft. deep at the center, the hull will be divided into seven watertight compartments, with a collision bulkhead, and with a watertight collision steel deck, 11 ft. below the main deck, running from the stem aft to the third compartment. The two inclined, compound engines of 5,500 H. P. and the Scotch boilers are to be set in steel enclosures rising above the main deck, and covered with a steel deck. There will be steam steering gear operated from an insulated pilot house. The electric lighting plant will consist of three General Electric 50-kilowatt vertical marine sets, with tandem compound engines, to be arranged for both condensing and noncondensing operation. They will be connected up in multiple arc, so that they may be run singly or in a group, and must develop 200-candle power for each mechanical horse power The current will be distributed by the two-wire system with special insulation and will light 1,600 16-candle power lamps. Besides a fire extinguishing service with thirty hose connections in different parts of the vessel, immediately controlled from the main engine room, there will be powerful steam fire pumps and additional hand fire pumps, with the usual equipment of chemical apparatus, etc. A Lyle life gun, such as is employed in the United States life saving service for throwing lines, twelve 26-ft. metallic life boats, ten 20-ft. rafts and 1,400 cork life jackets are provided further to insure the safety of the 1,200 passengers the steamer is built to accommodate.

The interior finish of the steamer will be particularly elaborate, the woodwork being pine, decorated with carving, particolor frescoes, and heavy gilding. The most modern system of plumbing, supplied with pressure water service by a special pump, will be introduced, and the steam heating apparatus will be sufficient to maintain a temperature of 65° throughout the vessel in the coldest weather.

The general construction of the freighter, which is to be a twin-screw steamer, will be like that of the passenger boat. Her dimensions are: Length over all, 318 ft.; length on waterline, 291 ft. 3 in.; molded beam, 60 ft. 6 in.; moulded depth, 22 ft. 6 in. She will have two vertical triple-expansion engines giving 4,500 H. P. and will be equipped with steam steering gear, an electric lighting plant, and double freight elevators for forward and after hatches. The entire coustruction and fitting up of both vessels—except for upholstery, furniture, etc.—will be done at the Fore River yard. This is rather a departure for the Fall River Liners, which have previously been built under separate contracts for hulls, engines and joiner work. This and the other work taken on in the last month will necessitate a very considerable increase of the Fore River's force of workmen in almost every department.

OIL FUEL TESTS ON THE KENSINGTON.

If the experiments which the International Navigation Co. is now conducting on board the steamer Kensington prove successful it is likely that a revolution in the operation of ocean steamships will take place. They are trying oil for fuel under some of the Red Star liners' boilers, and while, as yet, no announcements have been made, it is known that experiments thus far conducted have been successful enough to warrant further tests. Although little that was definite could be learned regarding the test of the oil fuel in the last trip of the Kensington to this country, it is known that crude kerosene oil had been burned continuously, instead of coal, under the single-ended boilers of the vessel. But at all events further tests are to be made on the outward and return passages of the Kensington, after which time the success or failure of the experiments will have been demonstrated. If successful, some important announcements which may concern all the vessels of the big steamship corporation may be looked for. Clement A. Griscom, Jr., said that nothing would be said now regarding the experiments, because as yet they were incomplete. Inside of a month, however, Mr. Griscom said, the tests would undoubtedly have been carried to a finality. Several weeks ago the Kensington began oil-fuel experiments, but because of the furnaces, which allowed flames to come out of the funnels, the tests were not very satisfactory.

NEW LIFE-SAVING GLOBE.

A report has been received from London of another test given the life-saving globe invented for use in shipwrecks by Capt. Donvig, a Norwegian. The object of the test was to ascertain how the craft would behave in heavy seas. While the waves were running extremely high, and a sea was running in which it was declared no life boat could live, the globe was towed by a tug from Dover harbor into the channel. In order that the apparatus should, as near as possible, be in the same condition as it would be if used in case of shipwreck, it was weighted with sand bags, which, with four men who were in the globe, made the weight equivalent to that of twenty men and 30 days' provision.

The globe, without its crew, was first towed out to sea, between Dover and the South foreland. The strong wind raised terrific seas. Several times the tug was caught in the trough and her decks were completely swept so that it was necessary to batten down all the hatchways. But the globe rode over the waves like a cork. Finally it was towed into quiet water, where Capt. Donvig, accompanied by three Dover seamen, went aboard. They fastened the manhole and the globe was again towed to sea. When the full force of the winds and seas was experienced Capt. Donvig signalled through the manhole to cast off the tow rope. The globe left to itself bobbed about in the heavy seas but showed no inclination to roll over. After tossing about for ten or fifteen minutes Capt. Donvig and one of the sailors emerged from the manhole and lashing themselves to the globe set a small sail which they pulled through the manhole with them. The air fuunel was used as a mast and the queer craft was navigated back to harbor, a distance of several miles.

BUILD UP THE NAVY SAYS THE PRESIDENT.

President Roosevelt makes a great plea for the navy in his message to congress. Ample funds for gun practice is his first appeal. The only shots that count in battle, he says, are the shots that hit. He also calls special attention to the need of providing for the manning of the ships. "Serious trouble threatens us," he says, "if we cannot do better than we are now doing as regards securing the services of a sufficient number of the highest type of sailormen, of sea mechanics. We need a thousand additional officers in order to properly man the ships now provided for and under construction. The classes at the naval school at Annapolis should be greatly enlarged."

As to the need of providing additional vessels each year, the president says: "There should be no halt on this score. We have deliberately made our own certain foreign policies which demand the possession of a first-class navy. The isthmian canal will greatly increase the efficiency of our navy if the navy is of sufficient size; but if we have an adequate navy, then the building of the canal would be merely giving a hostage to any power of superior strength. The Monroe doctrine should be treated as the cardinal feature of American foreign policy; but it would be worse than idle to assert it unless we intended to pack it up, and it can be backed up only by a thoroughly good navy. A good navy is not a provocative of war. It is the surest guaranty of peace.

"Each individual unit of our navy should be the most efficient of its kind as regards both material and personnel that is to be found in the world. I call your special attention to the need of providing for the manning of the ships. There is not a cloud on the horizon at present. There seems not the slightest chance of trouble with a foreign power. We most earnestly hope that this state of things may continue; and the way to insure its continuance is to provide for a thoroughly efficient navy."

The manufacture of steel cars is certainly a very important new element of consumption in steel plates in the United States. Steel cars were practically unknown ten years ago and yet the estimated consumption of plates for them this year is equal to the total make of plates in 1890. During the month of October the Pressed Steel Car Co. of Pittsburg built and shipped 3,000 cars of the wood and steel type. The average for the twenty-seven working days of the month was 111 cars per day. The plant turned out up to Nov. 1 of this year, 22,402 cars, requiring about 350,000 tons of steel in their erection.

SECRETARY MOODY'S ANNUAL REPORT.

The first report of Secretary Moody as the head of the navy has just been made public. Its salient features are his recommendation that the policy of laying down new fighting craft be continued, and his strong argument for substantial and immediate increase of officers and enlisted men. Of the ships the report says:

"I believe it to be my duty to recommend a continuance without interruption of the increase of ships. The precise type of ships authorized must, of course, like the authorization itself, be referred to the wisdom of congress, to whose committees recommendations in detail may be made. Differences of opinion exist among naval authorities, but all agree that not less than two battleships should be among the number authorized. Whether the others should be of the armored cruiser type or of the unarmored cruiser and gunboat type, which have proved so useful, may well be left for future discussion. A permanent ambulance or hospital ship, designed for hospital purposes only and having the right to fly the flag of the Geneva conference, would undoubtedly prove an important adjunct to extended naval manœuvers, whether in time of war or peace."

As to vessels under construction, Secretary Moody says. "At the close of the year there were under contract construction eight battleships, six armored cruisers, nine protected cruisers, four monitors, thirteen destroyers, seven torpedo boats and seven submarines. Progress upon these vessels, particularly those of the larger class, has not been satisfactory. The battleships are from ten to twenty-nine months behind contract time, the armored cruisers from four to thirteen months, the protected cruisers from six to eighteen months, the monitors from sixteen to nineteen months in arrears. In the cases of the larger vessels the causes assigned are the non-delivery of structural material, the inability of ship builders to obtain a sufficient supply of skilled labor, and in some cases, strikes. The department has recently taken steps to remove, as far as practicable, any grounds of delay over which it can exercise control, and has notified contractors that they will be held to accountability for failure to push construction with due diligence. During the year the following vessels have been finally accepted: Battleships Alabama, Wisconsin and Illinois, torpedo boats Bailey, Bagley, Barney, Biddle, Shubrick and Stockton. Torpedo boats Thornton and Wilkes and destroyers Decatur, Perry and Preble have been preliminarily accepted. Between July 1, 1902, and Nov. 1, 1902, the Thornton has been finally, and the following-named vessels preliminarily, accepted: Monitor Arkansas, destroyers Barry, Chauncey, Dale, Paul Jones, Truxton, Whipple and Worden, and torpedo boat De Long. Monitors Catskill, Manhattan and Mahopac and receiving-ship Vermont have been stricken from the navy register during the fiscal year."

Secretary Moody says that under legislation passed at the last session of congress, construction of two battleships, one to be built at a navy yard; two armored cruisers and two gunboats have been begun. Work on one of the battleships, the Connecticut, has commenced at the navy yard, New York. The contract for the other battleship, the Louisiana, has been awarded to the Newport News company, after competition, for $3,990,000. Instructions have been issued for the keeping of an accurate and detailed account of the cost of inspection and construction of these two ships, in order that the relative cost of navy yard and contract construction may be ascertained and reported to congress, as the law directs. The Connecticut and Louisiana are to be battleships in the strictest sense, equipped with the most powerful guns and protected by the heaviest armor in use in the navy; the speed to be 18 knots, the highest speed that could be attained within the prescribed limitations of cost and displacement, and with due regard to the character of these vessels as battleships of the first class, able to keep the seas against any warships afloat. In making separate provision for two "armored cruisers," congress made plain its desire that they should be of a different type. Accordingly the Tennessee and the Washington are to have less armor protection and lighter batteries, but more speed, than the battleships, the speed to be 22 knots.

Coming down to what he calls "the most imperative need of the navy"—that is, more officers—Secretary Moody says: "I cannot overestimate this need. It invites the instant attention of congress. The department is embarrassed almost daily by the lack of officers below command rank. This condition has been approaching for some years. It is acute today, and, when the ships already authorized are completed, it will be desperate unless there is early action. A statement of this kind cannot safely rest upon mere assertion, but demands verification by a comparison of the number of officers with the duties which are required of them. Following is a table descriptive of conditions existing in the line on the 1st day of October last, a recent date illustrative of the present conditions:

Number of line officers, including midshipmen, required for vessels now on the navy list	1,206
Officers on inspection, court-martial duty, naval academy, recruiting, ordnance, equipment and engineering duty	264
In transit to and from stations	70
Sick	30
Leave or waiting orders	30
Total	1,600
Number of officers now on navy list, including midshipmen after graduation	1,023
Deficiency	577

In the above table only the serviceable ships of the navy are included, and to them there is allotted only the minimum number of officers required, the allowance being less than that made in the other navies of the world. Even in time of peace when a considerable portion, say one-quarter, of the serviceable ships would be out of commission undergoing repairs and improvements, and thus releasing for other duty approximately 300 officers, and after the detachment of officers from every point of duty on shore where the law and the absolute requirements of the service would permit it, we could not officer three-quarters of our present fleet. But any comparison which does not take into account at least the future which is in sight would be totally inadequate. In four years it is estimated that not less than 160 officers will leave the service through resignation, retirement, or death. The deficiency in the number of officers required for the full complement of naval duty will be at the end of four years as follows:

Present deficiency	577
Needed for new ships	622
Needed to fill vacancies	160
Total deficiency	1,360

"I am informed," says the secretary, "that under existing conditions 355 graduates of the naval academy may be expected during these four years. Unless, therefore, the above computation can be shown to be erroneous, we shall have in the near future something more than a thousand officers less than the proper complement. The officers we need can be obtained from three sources only—by appointment from civil life, by promotion from the ranks, or by education and training at the naval academy. The first source has been uniformly rejected. The law already allows promotion from the ranks of not exceeding six enlisted men per annum. I recommend that this law be amended so as to permit the promotion of not more than twelve per annum. But the main source of our supply of officers must be from the naval academy, which produces officers the equal of any in the world. I earnestly recommend that without a year's delay the number of midshipmen at the academy be increased sufficiently to meet the present and prospective needs of the service. There is and will be in the immediate future, a sufficient number of officers above the rank of lieutenant commander. The increase should be in the number of lieutenant commanders, lieutenants and ensigns."

Of the crews the report says that the number of enlisted men in the naval service on June 30, 1902, was 21,433. Of these, 8,032 were landsmen for training and apprentices. Eighty-nine per cent. of the enlisted force are citizens and 76 per cent. are native born. The present number of enlisted men authorized by law is 28,000. By enlistment since the close of the fiscal year, the number of men in the service has been brought up to 25,258 on Nov. 15 current, and it is believed that by February next the full number authorized will be enlisted. The same reasons which demonstrate the necessity for an increase of officers call for the increase of men. The increase can be made gradually, and I recommend that an addition of 3,000 be authorized during the next fiscal year.

Minor features of the report are a statement as to oil fuel experiments, which have been successful; as to ordnance, 233 guns, mostly of large caliber, having been made at the naval gun factory; advance in armor, gun and smokeless-powder making; wireless telegraphy experiments, which are not yet very definite; and naval stations in our insular possessions and elsewhere.

BIDS FOR DREDGES.

Bids have been opened at Charleston for the construction of government dredges for Jacksonville and Pensacola. As the appropriation was $150,000 for each dredge the bids are somewhat in excess of it. The bids were as follows: Percy & Small, Bath, Me., two large dredges $342,890, one large dredge $174,145; Bucyrus Co., South Milwaukee, Wis., two small dredges $359,500, one small dredge $179,850; Townsend & Downey Ship Building & Repair Co., Shooter's Island, N. Y., two large dredges $440,000, one small dredge $224,000, two small dredges $386,000, one small dredge $196,000; Susquehanna Boat Works, Havre de Grace, Md., two large dredges $440,000, one large dredge $225,000, two small dredges $294,000, one small dredge $195,000; James Reilly Repair & Supply Co., N. Y., two large dredges $321,000, one large dredge $166,749, two small dredges $298,324, one small dredge $150,000; Great Lakes Engineering Co., Detroit, Mich., two large dredges $337,500, one large dredge $170,000, two small dredges $286,200, one small dredge $144,450.

A report from the bureau of navigation shows seventy-two vessels of 12,211 gross tons built in the United States and officially numbered during the month of November. The list includes on the Atlantic coast t...rty-three wooden sail vessels of 5,923 tons and fourteen wooden steam vessels of 759 tons, as well as two steel steam vessels of 2,505 tons; on the Pacific six sail vessels of 2,378 tons and three steam vessels of 114 tons, all of wood; on the great lakes five wooden steam vessels of 231 tons, and on the western rivers nine wooden steam vessels of 301 tons.

SCOTTISH SHIP BUILDING LETTER.

Glasgow, Nov. 24.—In former letters I have referred to the applications made by the Fairfield Ship Building & Engineering Co. Ltd., and John Brown & Co. Ltd., to the Clyde navigation trustees for a deepening of the River Clyde in order that they may construct such vessels as the two new Cunarders stipulated for in their agreement with the government, and also the modern type of heavy battleships. The Fairfield yard is in the commercial area of Glasgow; that of John Brown and Co. is some 4 miles lower down the river. Between each yard and the open waters of the lower Firth, or estuary, the river winds a good deal and has some parts of no greater depth than 26½ to 26¾ ft. The comparatively shallow portions are due to the non-completion of the whole of a scheme for deepening the channel which was agreed to some ten years ago. There were some obstacles left over at that time, notably one called the Elderslie rock, on which a great deal of money has been spent, but over which the low water depth is now only a little over 20 ft. What is wanted is a navigable channel from Glasgow harbor to the sea of a depth throughout of not less than 30 ft., at three-quarters tide. The new Cunarders, on the scale projected, will draw about 29 ft., and the battleship now building at John Brown & Co.'s will draw 27 or 28 ft. A minimum depth of 30 ft. is, therefore, narrow enough and this depth must be procurable some time before hightide, because the length of river to be traversed before the deep sea reaches are attained is about 15 miles. The monsters must be got from the yards to the open roads in one tide. Then the curves of some of the windings of the channel will have to be widened to permit the safe passage of vessels 750 ft. long by nearly 80 ft. broad, as the new Cunarders are to be. Between Port-Glasgow and the Tail of the Bank, which is practically a roadstead anchorage, the channel is of 33 ft. depth. The Clyde trustees have notified the two ship building companies mentioned that the facilities they require for the work in view will be provided, and that they may safely count upon a channel of the necessary depth and width being ready within the time by which the vessels can be built. There is, therefore, every probability of one of the Cunarders, if not both, being built on the Clyde. We should like to build them both here, because all the famous boats of this historic line have been Clyde-built, and Glasgow was the birthplace of the company. It may also be recalled that the Fairfield yard was the birthplace of the Atlantic greyhounds of the Guion Line, which began the revolution in transatlantic shipping.

The subcommittee of the British Corporation for Survey and Registry of Shipping have now completed their tour of inspection by visiting Dumbarton and Troon ship yards. After inspecting the yard of A. McMillan & Son, where the committee had an opportunity of examining a fine sailing ship, fitting out a float, and other work in progress, they proceeded to the adjoining works of Wm. Denny & Bros., where they were met by several members of the firm. The principal object of interest there was the famous experimental tank, and a considerable time was spent in examination of the different processes, from the preparation of the models to the final automatic records of their work in the tank. The various vessels in progress in the yard were inspected, and then visits were paid to the engineering works and to the Dennystown forge, where a large forging for a propeller shaft nearly 40 tons in weight for H. M. S. Commonwealth was seen, this shaft being in the rough state about 50 ft. in length by 21 in. in diameter. A visit was next paid to the works of the Ailsa Ship Building Co. at Troon. The work seen in progress there consisted of a sailing ship for Glasgow owners, a beautifully-modelled steam yacht, and a large coasting steamer building to the British Corporation class, besides other work of an important character in the two dry docks belonging to the firm. The committee have compared the methods of construction in the different districts, and in the different establishments in each district, throughout the country, as well as the great extensions and developments in many places, and the modernizing of the tools for carrying on work in the most efficient and economic manner.

As bearing on the growing depression in ship building, the report of the Associated Shipwrights' Society for the last quarter states in all the principal ship building districts, with one exception, there is a decrease in the work on hand, and a larger percentage of unemployed than for some time past. This has affected the society, as there has been a gradual increase in unemployed benefit. The tendency of trade is in a downward direction, but with the advent of the New Year and the lessened price for raw material it is hoped many orders for new ships will be placed. For the quarter the income of the Society was in round numbers £9,455, which was less by £591 than the previous quarter, but more by £757 than the corresponding quarter of 1901. The expenditure was £6,375 less by £454 than that of the previous quarter, but more by £1,196 than that of the corresponding quarter of 1901. The net gain on the quarter was £3,080, which brings the reserve fund up to £117,978. The quarter began with 19,362 members, and ended with a net gain of thirty-one.

The general secretary of the Amalgamated Society of Engineers in his report to the branches for the third quarter of the year says that the general fund now stands at £356,764 and the superannuation reserve fund at £167,975. The grand total is now £524,740, as compared with £515,704, an increase on the quarter of £9,035. Arrears have slightly increased, the total now being £30,225, which is equal to 6s. 6¼d. per member. During the three months donation benefit cost £21,955; sick £10,819; superannuation £24,007; and funeral £2,912; and there was expended from the contingent fund £891, and from the benevolent £756. The journal of the society for November states, over the signature of Mr. Gleanie, who is acting general secretary during Mr. Barnes' absence with the Moseley commission in America, that the membership of the society is now 92,650, as compared with 92,629 last month. On donation there are 4,151 members as against 3,930; on sick 2,092 as against 2,003, and on superannation 4,202 as against 4,155.

Another variety in Scotch-built vessels is the new hospital steamer Joseph and Sarah Miles, built by Hawthorne & Co. Ltd., Leith. She has just been fitted out at the old dock, Leith, and was dedicated by the Very Rev. James Mitchell D. D., South Leith parish church, ex-moderator of the general assembly of the Church of Scotland. This vessel, which is 145 ft. long and 22 ft. 6 in. broad, has been completed at a cost of about £12,000, and is similar in all respects to the Alpha and the Queen Alexandra, built by the same firm. All three belong to the Royal National Mission to Deep Sea Fishermen. The new vessel, which carries fourteen of a crew, including Capt. White and a medical officer, proceeds to Yarmouth to be supplied with trawling gear, so that she may as far as possible be self-supporting, and she is provided with comfortable hospital accommodation for the use of fishermen suffering from illness or accident in the North sea fisheries.

WORK OF THE LIFE-SAVING SERVICE

The general superintendent of the life-saving service has rendered his report for the year 1902. It continues to show most gratifying results of the work of this humane organization. While the statistics regarding loss of property included in such reports as these are likely to be only approximate, the statistics regarding lives risked and lives saved are, of course, absolute. The life-saving service is one of the most glorious institutions maintained by the United States government and is credited with a long roll of honor.

The number of disasters to vessels within the scope of the operations of the service during the last year was greater than ever before, with the exception of the years 1898 and 1901, yet the loss of life was very small. The number of lives lost from documented vessels—those of five tons burden or over—was only nineteen, while six were lost from smaller craft—sailboats, rowboats, etc.—making a total of twenty-five—a number far below the average. All but five of those lost from documented vessels, and more than half of the whole number lost from craft of all descriptions, perished in two disasters—five on the coast of Cape Cod under deplorable circumstances (which involved also the lives of seven members of the Monomoy life-saving-crew) and nine 1 mile outside the entrance to Duluth harbor, Minn., and 1½ miles from the life-saving station, where two large steamers collided one of which sank within three minutes, before even the other vessel could render any aid. Of the remaining five who were lost from documented vessels, three were capsized while attempting to land in their own boats, one was scalded to death in the fire room of a stranded steamer by the bursting of a steam pipe when she struck, and one was swept overboard and carried out to sea by the first wave that mounted the vessel when she brought up on the bar. Most of the casualties to the smaller craft occurred at long distances from the stations, and all of them culminated almost instantly. In no case was any life lost through any fault of the life-saving crews.

The amount of property imperiled was greatly in excess of that of any previous year in the history of the service, owing to the unusual number of large vessels involved. No less than fifty-four vessels of over 1000-tons burden—of which number thirty-three were steamers—suffered disaster. Twenty-six of those vessels were of over 2,000-tons burden, and the average tonnage of the whole number was 2,653 tons. The loss of property, however, was comparatively light.

The number of stations embraced in the establisment at the end of the fiscal year was 272, of which 195 are on the Atlantic and gulf coasts, sixty on the coasts of the great lakes, one at the falls of the Ohio river (Louisville, Ky.), and sixteen on the Pacific coast.

The number of disasters to documented vessels was 385. On board these vessels were 3,424 persons, of whom nineteen were lost. The estimated value of the vessels was $9,253,630, and that of their cargoes $5,139,380, making the total value of property involved $14,393,010. Of this amount $12,125,220 was saved and $2,267,790 lost. The number of vessels totally lost was fifty-one. In addition to the foregoing there were 361 casualties to undocumented craft—sailboats, rowboats, etc.—carrying 796 persons. six of whom perished. The value of property involved in these instances is estimated at $174,120, of which $167,575 were saved, and $6,545 lost.

The foregoing summaries do not include the seven members lost from the Monomoy life-saving crew, nor seventy persons rescued by the life-saving service from various positions of danger, who would otherwise have perished.

The life-saving crews saved and assisted in saving 434 imperiled vessels, valued with their cargoes at $3,567,220. Of this number 334, valued with their cargoes at $977,500 were saved without other assistance. In the remaining instances—100 in number—the life-saving crews co-operated with wrecking vessels, tugs and other agencies, in saving property estimated at $2,494,665, out of a total of $2,589,720 imperiled. Besides these the crews afforded assistance of greater or less importance to 661 other vessels, rendering aid, therefore, altogether, to 1,095 vessels of all kinds, including small craft. This number is exclusive of 237 instances in which vessels running into danger were warned off by the station patrolmen. Two hundred and ten of these warnings were given at night by Coston lights.

The most distressing calamity of the year was the drowning of seven members, including the keeper, of the crew of the Monomoy station, which occurred on Mar. 17, 1902, off the coast of Cape Cod, only one man in the boat having escaped with his life. The Monomoy crew responded to a signal of distress displayed on board the coal barge Wadena, stranded on Shovelful shoal, and after safely taking into their boat the five men from the barge, were engaged in the difficult operation of turning the boat and getting away when a sea broke over them, and the rescued men (who had been properly placed and directed to keep still) were seized with panic, instantly rising up, clinging to the necks of the surfmen, and so interfering with the work of the oarsmen that they lost control of the boat, which broached to and capsized The loss of the lives of these brave men engaged in the act of saving the lives of others created everywhere a sense of profound sorrow. A movement to raise by popular subscription a fund for the relief of the widows and children left dependent and needy was at once inaugurated, and resulted in the contribution of more than $45,000. Many of the maritime organizations gave further expression to the general sentiment of the country through petitions and memorials to congress urging the passage of a pension act to provide for similar cases in the future. A bill was introduced into the house of representatives and favorably reported upon by the committee on interstate and foreign commerce.

The net expenditure for the maintenance of the service during the year $1,654,392.96. During the year new stations were completed at South Manitou and Sleeping Bear point, Mich. Plans and specifications are being prepared for a new station to be erected on Fishers' island, New York, and a new station at Arena Cove, Cal., is nearly completed.

New stations mentioned in the last annual report as under construction to replace old and unsuitable ones at Amagansett, Long Island, and Harvey Cedars, N. J., have been completed. Under contracts entered into during the year old stations which have become unsuitable for occupancy at Long Beach and Squan Beach, N. J., Seatack (Virginia beach), Virginia, Whales Head (Currituck Beach), North Carolina, are being replaced by new structures.

The construction of the new jetty at Sabin pass has resulted in making the location of the old station too far inland for practical service, and a wharf for the erection of a new one in a proper location is now in an advanced state of construction. The opening reported last year as being cut through the south pier of Buffalo river, at Buffalo, N. Y. to provide for the construction of a launchway for the proposed new station there, has been completed, together with the foundations and retaining walls, and plans and specifications have been made and proposals invited for the construction of a new station. A wharf upon which it is designed to erect a new station at Chicago is nearly completed, as are also a new floating station at Louisville, Ky. (the falls of the Ohio river), and one at Portage ship canal, Mich., to replace old and unserviceable ones. The station building which is to be replaced at Chicago was originally a boathouse only, which was afterwards converted into a temporary life-saving station to be used until a proper location might be secured and a building erected. Plans and specifications for the new building have been completed, and proposals are about to be invited. The widening of the channel at Racine, Wis., made it necessary to move the station there back from the river nearly into one of the city streets for temporary use. A new site has been obtained, and preparations are now under way for the construction of a suitable building.

Several stations on the ocean and lake coasts have been repaired to a greater or less extent as required. Under the provisions of the act making appropriation for the sundry civil expenses of the government for the fiscal year ended June 30, 1902, a Lyle gun, the beach apparatus to be used with it, and suitable surfboats have been placed at Cape Nome, Alaska. A suitable equipment, also authorized by law, has been located at Port Day, N. Y., for the protection of persons from drowning in the rapids of Niagara river.

J. L. Frohman, whose death was announced from Cincinnati a few days ago, was very well known to marine engineers and vessel men generally as the secretary of the Engel & Fagersten Chemical Co., Chicago manufacturers of boiler compounds. He met death in a strange manner—a fall in a bath tub at the Hotel Honing, where he was staying while on a business trip to Cincinnati. He was not discovered until several hours after the accident. It was evident that he had slipped in the bath tub, striking on the back of his head, probably dying at once.

SHIP BUILDING AT NEWPORT NEWS

Newport News, Va., Dec. 3.—Much interest is manifested here in the opening at the navy department Jan. 6 of bids for the construction of the new armored cruisers Washington and Tennessee. The Newport News Ship Building & Dry Dock Co. has announced its intention of going after at least one of these contracts. It is understood that one of these cruisers must be awarded to the Pacific coast, leaving one for the Atlantic coast. For the latter there will be a lively race. It is noticed that the Union Iron Works and the United States Ship Building Co. (the combination), have both asked for plans with a view of bidding. The Union Iron Works is now owned by the United States Ship Building Co. The fact that the Pacific coast yard and the parent corporation will both submit bids indicates that the trust, so called, is going after both cruisers. The Newport News yard recently underbid all competitors for the battleship Louisiana and it is going after the Washington or Tennessee in earnest.

On Friday the new Pacific mail steamship Siberia, which was built here and left last week for New York, will sail for San Francisco by way of the Straits of Magellan. The Siberia has been on exhibition at New York for several days and is now loading a large cargo for 'Frisco. She will make three stops en route, a West Indian port, Montevideo and a port in Chile. As soon as she arrives at 'Frisco she will enter the service of the company between that city and Hong Kong, with Honolulu and Yokohama as her principal ports of call. Her sister, the Korea, has been smashing records right and left since entering service and the behavior of the Siberia will be watched with interest.

Word has been received here of another new speed record between New York and New Orleans, just made by a Newport News-built ship. The new Morgan liner El Cid made the run down the coast from New York to New Orleans in 122 hours, 19 minutes, breaking the best previous record, which was 125 hours, made by El Alba, a new Morgan liner recently turned out here and a sister of El Cid. El Cid's average speed on the run, which was made under natural conditions, was 14.93 knots an hour, which is very fast for a ship that was required to make only 15 knots an hour under forced draft and trial conditions. Since the Newport News Ship Building & Dry Dock Co. began turning out ships for the Cromwell and Morgan lines some years ago, the speed records between the metropolises of the north and south have been held by their vessels without at any time surrendering the honors to ships of other lines making the run from the North Atlantic to the gulf.

The battleship Texas, which has been at the navy yard for two years or more being remodeled, was sent to sea last week on her trial and she returned disfigured. In addition to a small break in one of her engines, which was speedily repaired, the Texas had a mishap in one of her turrets which might have resulted fatally for a large portion of her crew. While at target practice outside of the Virginia Capes one of the hydraulic cylinders which returns the gun to battery was cracked, because it had been left filled with water when the gun was discharged. Glycerine and water mixed poured out on the turret floors and for a time there was considerable excitement as an explosion was threatened. It is not believed the injury is a serious one, but the Texas will probably be prevented from joining the other ships of the North Atlantic squadron for the maneuvers in the Caribbean. The ship was ordered back to the navy yard to have the necessary repairs made.

M. V. D. Doughty, superintendent of construction at the ship yard, has returned from New York and is now attending to his duties at the yard with a crippled arm. While inspecting a vessel at New York, with a view of making an estimate, it is understood, for repair work, Mr. Doughty fell through the hatch and sustained a serious sprain to his right arm. At first it was thought the member was broken but this proved to be not the case. Mr. Doughty was treated in New York for several days before returning home. He is one of the most popular officials at the yard and is regarded as one of the most expert ship builders in the world, having launched successfully more ships, it is said, than any man in America. He personally superintends the launching of every vessel put overboard by the Newport News Co.

The two Luckenbach steamers which are being converted into oil carriers at the ship yard are nearly ready to go in service. It is understood that the Sarah V. Luckenbach will leave in a few days, being farther advanced than the other ship.

The United States monitor Arkansas, which was built here and has been fitting out at the navy yard, will leave to-morrow for Culebra. The training ship Buffalo will be ready to leave the navy yard this week. It is understood that she will take up the wireless telegraphy experiments where they were dropped by the Prairie, which was ordered to Culebra with the squadron.

James F. Kelly, representing the Marconi Wireless Telegraphy Co. of America, spent a day in this city and a day in Norfolk with a view of interesting the shipping companies operating at these ports in a system which will be adopted at all seacoast cities for enabling vessels of a line to signal to each other and to send messages ashore.

IRON MAKING IN GERMANY.

Second to the United States in the production of iron and steel, like America Germany has surpassed Great Britain in this branch of industry by the attention given to the production of basic steel from ores, too rich in phosphorous for the acid process, by the Bessemer or the open-hearth process. German production of steel amounted last year to close upon 6,000,000 tons. No small part of this was the output of the great iron-making district of Westphalia. The greatest iron works of this district are of course, the Krupp Works at Essen. This vast establishment was the sole property of one man, Frederick Alfred Krupp, who lately died and who had in employment 43,083 persons. These are distributed amongst his various business establishments as follows: At the steel works at Essen 24,536; at the Grason Works at Backau 2,773; at the Germania ship building yard at Kiel 3,987; in coal mines 6,159; at the blast furnaces and proving grounds at Meppen 5,628. It is the custom to take a Krupp works' census from time to time, and by the last return of May 1900, it was shown that the total number of persons connected with the works, including wives and children of those employed, was 147,645.

The business was started in 1810 by Peter Freidrich Krupp, who was born in 1787, and in the following year he built his first furnace for the manufacture of cast steel. He was a dealer in colonial produce and had made some money in the course of his career, and this was invested in the new venture of cast steel making, an "art and mystery" then practiced in Sheffield, where it originated with Huntsman. For fifteen years Peter Freidrich Krupp persevered at this, to him, an unprofitable venture, and then died, leaving the secret of steel making with his son, the late Alfred Krupp, a boy of fourteen. This was in 1826, and for years the difficulties this lad had to contend with were severe; but in 1847 a 3-pounder cast-steel gun was finished and the foundation was laid of an industry that has since been chiefly associated with the name of Krupp. Another notable landmark in the history of the house was the invention of the weldless steel tire mill, the first tire, which must have been succeeded by millions of others, being made in 1853. The year 1862 was a memorable one, for it saw the introduction of the Krupp flat-wedge breech closing mechanism and the starting of the first Bessemer converter.

In 1864 rail and plate mills were erected; in 1869 the open-hearth, Siemens-Marten process of steel making was introduced; on July 14, 1887, Alfred Krupp died at the age of seventy-five, leaving his son Frederick Alfred to succeed him. There is now no living male descendant of Krupp the first. Between 1890 and 1892 the manufacture of armor plate was started, the result being the introduction of a process which has supplanted other methods. The latest notable record, which brings the history down to the present year, was the acquiring by Mr. Krupp of the extensive ship yard at Kiel formerly the property of the Germania Ship Building & Engineering Co. The entire management of this vast undertaking was entrusted by the owner to a board of fourteen directors, twelve of whom are at Essen, one at the Gruson works at Magdeburg, and one at Kiel.

The modest building which is the ancestral home of the Krupp family is still carefully preserved and stands in the center of the present works surrounded by workshops and chimney stacks—a striking contrast to the magnificent building amongst the hills where the late owner lived. The material which the works were started to make, crucible steel, still forms a notable feature of the product, and an ingot of no less than eighty-five tons has been cast from numberless crucibles carried from the melting furnaces by a couple of men. The extensive use of crucible steel in these works is well known, and the management attributes the success undoubtedly reached in this field to their application of crucible steel to purposes where other methods of manufacture are generally considered sufficient. The special methods and appliances which long experience has evolved in this field of heavy production of a comparatively costly material, undoubtedly render the process of manufacture cheaper than would be the case with works operating on a smaller scale; but, however this may be, the Krupp works find it preferable to use crucible steel, not only for guns and projectiles but for parts of locomotives, stationary and marine engines, hoisting machinery, etc. Some very massive parts, such as rolls for heavy rolling mills, are also made of crucible steel.

The following statistical data are available: In 1901 the Essen works contained 5,300 machine tools and workshop appliances, twenty-two trains of rolls, 1,414 steam hammers, sixty-three hydraulic presses—two of them bending presses of 7,000 tons each, one forging press of 5,000 tons, and one of 2,000 tons effective power—327 stationary boilers, 513 steam engines with a total of 36,561 H. P., 269 electrice motors, and 591 cranes.

But the Krupp industries are not all. At the Union Works at Dortmund there are five blast furnaces, two of which are being reconstructed. The annual output is 300,000 tons of pig iron In the steel works there are four converters, each of sixteen tons capacity, and four open-hearth furnaces, each of twenty-five tons. There is also a crucible steel plant. The annual output of basic steel is 300,000 tons and of open-hearth steel 82,000 tons. Crucible steel to the extent of 3,600 tons is also manufactured. There is a rolling mill plant which will produce 180,000 tons of rails, girders, etc., yearly. In the forge there is a mill for rolling merchant iron and a foundry for steel castings, the annual output being 5,000 tons.

Power is generated at a central station and is transmitted by electricity, the seven dynamos being of 16,024 H. P. A bridge-building department has lately been added, whilst for the production of railway wheels, axles, points, crossings, etc., there is an extensive plant of modern description, including some heavy machine tools. In addition to this there has recently been added a railway carriage works and a building yard for the construction of small vessels, pontoons, etc.

The Hoesch Iron & Steel Works, another establishment at Dortmund, has four blast furnaces. The coke ovens which produce fuel for the furnaces are worked in connection with the plant for the production of by-products, 4,700 tons of tar and 2,100 tons of sulphate of ammonia being recovered annually. There is a central power station for producing electric current, which is generated by dynamos driven by both steam and gas engines. There is also a factory for utilizing the slag, otherwise a waste product expensive to dispose of, by making it into cement. The rolling mills produce girders, rails, sleepers, plates, etc., and there is also a wire mill. In the basic-steel works there are three converters.

The ouptut of basic steel is 225,000 tons a year; and about 60,000 tons of acid steel are produced annually from four open-hearth furnaces. The number of men in this branch is about 3,200, and the yearly turnover about $10,000,000. The same company also owns two collieries employing about 2,311 men, and also a producing interest in iron ore mines.

The Hoerde Works—Hoerder Berwerks & Hutten-Verein owns six blast furnaces at Hoerde five of which have a capacity of 330,000 tons of pig iron per annum, the product being chiefly basic iron. Here is the first iron mixer constructed in Europe. The appliance, which is of American origin, is a vast containing vessel, into which the molten iron is poured, and in this way the product of different tappings of the blast furnace can be mixed together, thus equalizing the character of the metal and allowing for greater regularity in working. There are also two blast furnaces at Dortmund, but these are not in operation just now. The steel works contain four converters, working on the basic system. They produce about 30,000 tons per month. The blooming mill will roll 28,000 tons of ingots per month, whilst 5,000 to 7,000 tons of rails, girders, angles, flat bars, etc., are rolled per month, and 5,600 tons of material per month of various steel products are rolled in other mills. In the plate mill the product is 5,000 tons of rough plates, and in the sheet mill 1,000 tons of fine sheets are produced per month.

In the forging departments there are produced pressed steel boiler ends, domes, locomotive fire-boxes, and many other stamped parts to the extent of 300 tons per month. There is a tire mill, and forgings of all kinds for railway and marine work are produced, there being a 2,500-ton hydraulic press. The steel foundry turns out 250 tons of castings per month. Power for the foundry is supplied from the Hoerder works by a central station, the dynamos for generating electric current being driven by five gas engines which are actuated by the waste gases from the blast furnaces. The current is polyphase, the pressure being 3,000 volts. The coal mines owned by the company are also supplied from this station.

At the works of the Vulcan company at Hochfeld on the Rhine, there are three blast furnaces, of which two are at present at work. One is of special design, there being an iron plating lined with firebrick to form the body and hosh of the furnace, and so arranged that the whole exterior of the furnace is water cooled. It is claimed that greater durability and regularity of working are obtained in this way, and there is less consumption of fuel owing to the latter fact.

The Duisburger Maschinenbau Co., manufacturers at Duisburg rolling mills and engines for driving them, hydraulic machinery and other iron works machinery, as well as chains, wire rope, etc. At works situated at Hochfeld, cranes, rock drills and compressors are produced. The entire works are driven electrically. About 11,000 workmen and officials are employed.

The Gutehoffnungshutte at Oberhausen are among the oldest works in the Rhenish Westphallan district, having been founded in 1808; but, in regard to a part, date back to 1757. The Oberhausen works have nine blast furnaces, puddling furnaces with rolling mills, and steel works. In 1900 the production of pig iron was 397,953 tons and the output of the rolling mills 310,375 tons of steel and iron products. The firm also during the same period manufactured engines, boilers, bridges and iron castings amounting to 46,615 tons, and raised 1,372,447 tons of coal and 305,990 tons of iron ore. The number of workmen and officials employed was 13,640, the sum of $4,610,500 being paid in wages.

The Rheinsche Stahlwerke Co. at Ruhort has three blast furnaces giving 1,000 tons of iron daily. There are two tipping iron mixers, each of 250 tons capacity. There are four 15-ton basic Bessemer converters. There are cogging and finishing mills, the latter of the "three-high" type, and all auxiliary machinery is driven electrically. The product of the works is 1,500 tons per diem. All the ingots produced in the basic steel works and a portion of those from the open-hearth furnaces are passed through the cogging mill to the finishing rolls without being placed in a reheating furnace. Three thousand eight hundred work people are employed.

NEWS OF THE GREAT LAKES

ENORMOUS MOVEMENT OF FREIGHT ON THE LAKES.

With the prospects of lake navigation running into the middle of December it is now certain that the output of iron ore will be more than 27,000,000 gross tons, or a gain of about 7,000,000 tons over last year. The force of this one item as an illustration of the growth of lake commerce in late years will be understood when it is noted that only eight years ago, in 1894, the total output of ore was little more than 7,000,000 tons. The ore men themselves—managers of the mines and shippers of the ore—talked of only 23,000,000 tons when the season opened, as they thought an increase of 3,000,000 tons over 1901 would greatly tax the docks and the railways. Practically all this ore has been moved on a basis of 75 and 80 cents lake freight for the water haul of about 850 miles from the head of Lake Superior. The ore shippers had fortified themselves with lake freight contracts, and the dollar rate prevailing for a few days past is being paid on only a few straggling cargoes. The vessels are also getting $1 freight now on coal going to the head of Lake Superior but they will not manage to have this advance make much of an average against the low-freight coal of the spring and summer months, as the rise came too late and is good for only a trip or two.

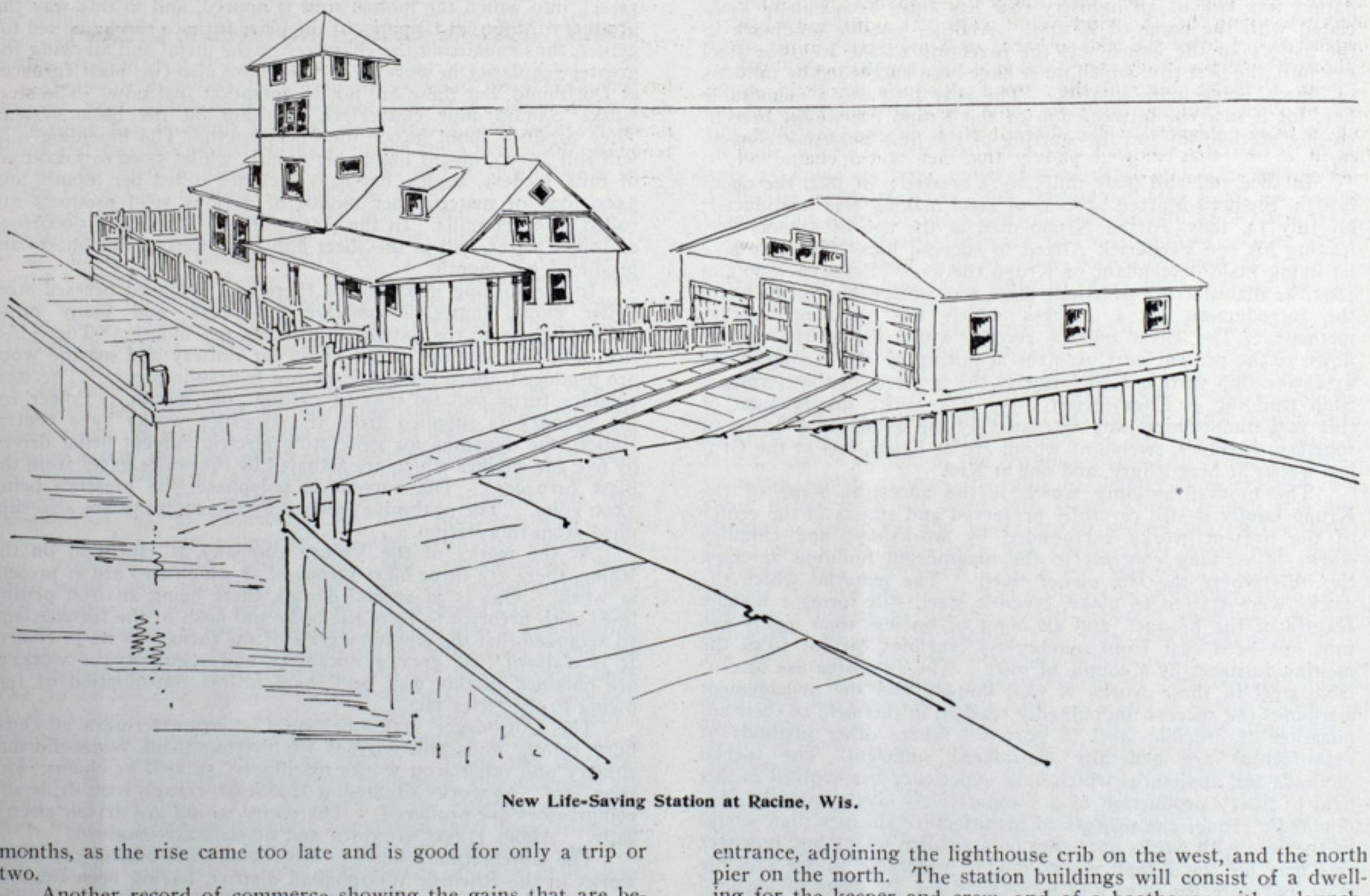
Another record of commerce showing the gains that are being made in the movement of all kinds of freight comes from the canals at the Sault. The canal reports show in round numbers a total movement of 35,065,000 net tons to Dec. 1 of this year, as against 28,403,065 tons for the entire season of 1901. In the matter of Lake Superior commerce as a whole the increase this year will therefore be about 7,500,000 net tons, as the December movement of freight will bring the total for 1902 up to about 36,000,000 tons.

ENGINEERS TO MARK WRECKS

Gen. Gillespie, chief of army engineers, has notified officers of the engineer corps on the great lakes to immediately mark wrecks and other obstructions as they occur hereafter. It is said that heretofore wrecks were not marked immediately by the engineers for the reason that there were no funds available for the purpose. By the time funds were secured weeks might have elapsed. The new order sent out by Gen. Gillespie authorizes the engineers to draw money for this purpose from funds at their disposal, reimbursement to be made by the war department later. As the engineering corps has no vessels for this purpose, they are authorized to charter tugs and to mark the wrecks whether abandoned by the owner or underwriter or not. In other words the wreck is not to be permitted to be an unmarked menace to navigation for an instant. The first vessel to be marked under this new order is the schooner Mosher, an account of which is published elsewhere in this issue. Whether this activity on the part of the war department is an outcome of the recent appeal to the navy department to have the gunboat Michigan mark certain obstructions is a matter of conjecture and is really of no importance whatever. The essential point is that wrecks are to be marked without delay.

NEW LIFE-SAVING STATION AT RACINE.

The United States life-saving service will early next spring replace the present old buildings of the life-saving station at Racine, Wis., by a new and more suitable plant, which will be at the same time located to greater advantage for the efficiency of the station than the existing one. The new site is on the shore of Lake Michigan, and on the north side of the harbor entrance, adjoining the lighthouse crib on the west, and the north pier on the north. The station buildings will consist of a dwelling for the keeper and crew, and of a boathouse with a launchway attached. Both buildings will be erected upon a substantial wharf made of cedar piles and Georgia pine timber. The launchway, part of which is to cut through the harbor pier, will be similarly constructed.



New Life-Saving Station at Racine, Wis.

The dwelling will be 30 by 50 ft., two-story frame, with veranda and lookout tower; it will be plastered inside, have maple floors and white pine finish. The dimensions of the boathouse are to be about 45 by 45 ft. It is to contain one 25-ft. surfboat, and one 34-ft. lifeboat, besides the beach apparatus wagon.

Work on the new fire boat designed by Naval Architect W. J. Wood for the city of Milwaukee is now being vigorously pushed at the yards of the Ship Owners' Dry Dock Co. in the north branch of the Chicago river. The keel for the new vessel was laid some time ago, and the frame work will be completed by Dec. 15, when the Milwaukee board of public works will make its first inspection.

LAKE ERIE GALE AND ITS DREADFUL RESULT.

The story of the five-day battle of the schooner Mabel Wilson in a storm on Lake Erie, during which the steamer Macy went down with all on board, is a most graphic one. The Wilson is at present in Detroit. She is in a much battered condition. Her deck house, containing a large boiler with the donkey engine for hoisting, was built of substantial 4x4 joists and uprights, heavily planked and bolted to the deck. In spite of this, the waves breaking over the bow smashed in the front of the deck house and snapped off the uprights as if they had been matches, tore loose the ¾-in. iron bolts and moved the whole upper part a foot back, carrying with it the heavy upright boiler, and snapping off the large steam pipes. The coal bunkers on either side of the deck house were smashed and their coal washed out onto the deck. The bulwark planking was torn off for 20 ft. on either side, and through this the coal was washed into the lake. The tearing out of the bulwark planking helped to rid the deck of the water which washed waist deep about the crew of eight men who, fighting for their lives in pitch dark, battled with the waves, which tore loose the canvas battens with which the wooden hatch covers were protected. The battens were spiked to the hatchways and covers through 2-in. cleats, but the force of the water ripped them up every little while. Then the men would drop to the deck and hanging on with one hand work desperately to make the hatches tight again, and thus the struggle continued all night long. The Wilson left Buffalo on Saturday afternoon in tow of the Macy.

"We started from Buffalo," said Capt. J. E. Gotham, "at 2 o'clock Saturday morning, figuring on passing through the Detroit river on Sunday. The wind grew stronger all the time. We scarcely made any headway at all, never more than 3 miles an hour, and often just holding our own. Off Long Point, Sunday afternoon, it was blowing a gale from the southwest and getting worse all the time. The Macy hugged the shore, my brother evidently thinking that the wind would shift. It didn't and when it began coming down the lake so hard, we being only 3 miles off the shore, he put the Macy about and stood off for the open. We got about 12 miles out and then stood along the shore again. About 10 o'clock Sunday night we could see that something was wrong with the steamer. She sheered off from one side to the other in a way that showed plainly that her wheel chain had parted and that men were in the hold trying to steer her with a tiller. It was blowing so hard that they could not hold her at all. After a little while she blew five whistles for a danger signal, and then blew again to signal us that she had dropped our tow line. We dropped anchor and after drifting a little ways it held, and we lay head on to the seas, which broke over our bows right along.

"The Macy drifted at least 3 miles before her anchor held. We could see her lights until about 3 o'clock in the morning. Then they disappeared suddenly, and we knew that their fight was done. It was Tuesday morning before we could put up a bit of canvas larger than a handkerchief. We could see no trace of the Macy. We made the best of our way to the mouth of the river, only getting to Amherstburg Thanksgiving day. We had another tussel Wednesday when we were nearly to the mouth of the river."

The corrected list of the crew of the Macy, taken from the last trip sheet, is: M. W. Gotham, captain, Richland City, Wis.; M. A. Gotham, son of captain, mate, Richland City, Wis.; W. F. Gregory, Detroit, first engineer; George Webb, Marine City, second engineer; Mrs. M. Ganger, cook, Michigan; W. F. Giese, St. Clair, Mich., wheelsman; William H. Donavon, St. Clair, wheelsman; H. St. Clair, lookout; L. R. Gotham, son of the captain, lookout; Mark Hornby, fireman; James Mack, fireman; John Hanolly, deckhand; James Mahoney, deckhand.

BIG MINES MAKING RECORDS.

Duluth, Minn., Dec. 3.— It is too late now to talk of freight conditions, as viewed from this end of lakes. Severe winter weather may bring everything to a standstill within a few days. The Steel Corporation is, however, still shipping about 10,000 tons a day from the Norrie group and the Tilden of the Gogebic range and about 15,000 tons from the Mesabi, with the Marquette and Menominee ranges averaging more than 10,000 tons a day each. Among the mines Norrie and Chapin have passed the million-ton point by considerable—by more than in any preceding year—and Fayal is now up to an even 1,900,000 tons for the season, while still moving ore at the rate of 5,000 tons a day. If the weather holds for a few days longer this mine may make approximately 2,000,000 tons for the season, which began in April. The Stevenson, Mountain Iron and Mahoning are close followers. The least of them has a record of about 1,300,000 tons.

Wisconsin grain interests are still working hard for a separate inspection of grain at the head of the lakes, and claim to have such assurances from the governor of the state and from others as to make them positive they will carry their point. Duluth grain interests are saying nothing but it is probable they are not idly letting this business become divided, to their loss.

The daily grind of flour at Duluth and Superior is lessened by the closing down of 2,000 bbls. capacity at the Listman mill, Superior, for the winter. This leaves the capacity of the Duluth-Superior Milling Co. at 6,000 bbls daily, and a further decrease is to be expected shortly. The company has maintained its output wonderfully well this fall, and is going into the winter with a far more satisfactory showing than has been made by head-of-the-lake mills for many years.

Construction of ships to be built at the works of the Superior Ship Building Co. (local plant of the consolidation) is stopped for the present on account of a lack of material. A large force of men is at work in the yard on repairs, etc., chief of which just now is on the Scottish steamship Turret Chief. The work of lengthening the launching slips to 550 ft. is about completed.

There has been a good deal of complaint among vessel men at this end on account of the early closing of lighthouses and fog signals. Navigation is still unimpeded and in full swing but several of these, among them important ones, have been closed. If these stations are ever of any value it is just at this time, when sudden and severe sleet and snow storms are probable.

The Great Northern road, in the construction of its new ore dock, will not employ contractors but will carry on the work in its own engineering offices. It is now expected that the Duluth & Iron Range road will rebuild its No. 3 dock, which is of but 16,200 tons capacity with ninety pockets. The dock will probably be raised 10 ft., bringing it to 62 ft. height and most of the raise will be below the hinge hole of shutes. It is also now expected that the Chicago, Milwaukee & St. Paul road will add to its ore dock capacity at North Escanaba. The company has 240 pockets of 20,400 tons capacity, in a dock built a year ago. The Wisconsin Central ore dock at Ashland, burned last week, is to be rebuilt this winter and work preliminary thereto is already well under way. This dock had 40,000 tons capacity and the new structure will be on the old foundation but probably somewhat higher and of greater capacity. It was 54.5 ft. high.

GREAT LOSS OF LIFE IN NOVEMBER STORMS.

No storms of recent years have created such widespread havoc on the great lakes as the two that came with the closing days of November. The mortality is greater than for many, many years past, and with high freights on final coal cargoes tempting the older and smaller class of vessels the end is probably not yet at hand, although it is hoped that extra precautions will be taken on December trips. Fifty-one lives have been lost on four vessels—Lockwood, Bannockburn, Macy and Celtic—that went down within a few days of each other. It was thought that all on board the steamer Hebard and one of her consorts, the Alona, were also lost on Lake Superior, where the last gale was fiercest, and that the list of drowned would be still further increased by some twenty-one or twenty-two men, but the crews of these vessels fortunately turned up after bitter struggles for life.

With one exception, the Bannockburn, the vessels lost were of the old type of wooden craft that are fast disappearing from the lakes. The loss of the Bannockburn, a modern British built steel ship, was, however, a very great surprise. She has simply disappeared on Lake Superior, to be put down among the missing. Her loss, if not due to special cause, seems to show that even the ships that are said to be much better from a structural standpoint than lake-built ships are liable to succumb to lake storms. The Bannockburn was owned by the Montreal Transportation Co. She was designed by Sir Raylton Dixon and built in 1893 at Middleburg, England. At Montreal she had to be cut in two to allow her to pass up the lakes through the St. Lawrence canals. She was put together again at Kingston. She was one of the best vessels owned in Canada. She was built entirely of steel, even to deck houses, was 255 ft. long, 40-ft. beam and 21 ft. 5 in. depth. Engines were of the triple-expansion type. She cost $140,000 and was insured for something more than $100,000. She always carried a complete set of sails to be used in case of emergency. With every modern improvement the steamer rated A1 at Lloyd's, and was considered most seaworthy. The owners scout the idea of such a vessel foundering. It is thought that something went wrong with the machinery or that perhaps she was blown up. The cargo of 85,000 bushels of grain was from Fort William and was being taken to Midland. It was worth $60,000 and was insured. The accident was one of the saddest that ever befel a Canadian vessel on the lakes. Geo. R. Wood, the captain, and Alexander Graham, first mate, lived at Port Dalhousie. Geo. Booth, chief engineer, as well as most of the balance of the crew, lived at Kingston.

While the Michigan Central and Grand Trunk railway officials have been wrangling over the proposed site for a bridge over the Detroit river at Detroit the vessel interests have had no cause for worry. It was certain that the bridge project would not make much progress while the railway companies disagreed and that more than one bridge would not be permitted under any circumstances. Now E. W. Meddaugh, counsel for the Grand Trunk, is credited with saying that the question of site has practically been agreed upon and that the congress now in session will probably be asked to pass a bill which he thinks will not meet with objection from the vessel interests on account of provisions as to height, wide river span, etc.

WHAT IS WANTED IN LIGHTS, FOG SIGNALS, ETC.

Congressman Burton of Cleveland has found time in the past, aside from his duties as chairman of the rivers and harbors committee, to give attention to the matter of aids to navigation on the great lakes—lights, fog signals, buoys, etc. The vessel owners have also had a great deal of assistance in this regard from the late Senator McMillan of Michigan. This year Congressman Burton has started out to give even more of his time to affairs of the lighthouse service on the lakes and the vessel interests are expecting a great deal from his efforts. Capt. Geo. P. McKay, chairman of the aids to navigation committee of the Lake Carriers, has submitted to Mr. Burton a long list of new lights and fog signals, changes in lights, new gas buoys, etc., that are wanted by the shipping interests. He lays stress on the gas buoys, he says, for the reason that vessel masters are generally agreed that they are first of all a reliable aid to navigation, that they are needed in the channels of the lakes more so than in any other part of the country, and that they are readily available for places where a great length of time and much expense would be involved in providing more costly permanent lights. Mr. Burton has been supplied with charts, on which are marked the points where these buoys and other aids to navigation are needed, so that he may take up the matter intelligently with the lighthouse officials. Capt. McKay also urges the necessity of providing another tender for the eleventh lighthouse district, which includes the St. Clair and St. Mary's rivers, as well as a part of the Detroit river, where the tender Marigold already has more than she can do in caring for floating aids. He suggests that the lighthouse inspectors are best equipped for the work of locating and marking wrecks and new shoals, and urges that they be given sufficient funds for this work, adding that there will be less worry on the part of the vessel men regarding the removal of these obstructions later by the engineer officers, if they are first hurriedly and properly marked by the naval officers—either the inspectors or the men on the U. S. S. Michigan.

It is reported from Washington that the lighthouse board is experimenting with a new form of buoy of less cost than that now in use and which, it is expected, will give a better light. It is to be hoped that this buoy will prove successful, but the vessel men feel that places where the buoys are very badly needed should not be neglected while these experiments are going on.

It is also understood that certain difficulties have arisen regarding the proposed new lightship for Southeast shoal, near Pelee passage, Lake Erie, for which an appropriation of $45,000 was secured some time ago. Of course it is well known that this shoal is in Canadian water—some twelve miles over the Canadian line. It is feared that the Canadian officials may require the lightship to be manned by Canadian sailors and show the English flag. The objection is made, not officially, however, that an American lightship on the shoal would invite American fishermen to fish in Canadian waters in violation of law. It is hoped that this difficulty will in some way be speedily disposed of, as Southeast shoal must be marked and the establishment of the new lightship was looked forward to with a great deal of satisfaction by the vessel men.

In the list of proposed aids to navigation submitted to Mr. Burton by Capt. McKay a lighthouse and fog signal for Middle island, Lake Huron, is put down as of first importance. Then follows in order of importance a light and fog signal at Rock of Ages, Lake Superior, a lightship with fog signal for St. Martin's reef, Lake Huron, and lighthouse and fog signal for Nine Mile point at the entrance to the Straits of Mackinac on Lake Huron. The board is also requested to move Waugoshance light in the straits. On this score the report to Mr. Burton says: "This light, built some fifty or more years ago, fully answered the purpose at that time and for a great many years afterwards, but new and dangerous shoals for the deep-draught vessels of today, making a course some three or four miles to the north of the light, have been discovered between the course of vessels and the light. The light should therefore be moved far enough to northward to cover the shoals, or possibly the shoal spots could all be dredged out at less expense and in shorter time than would be required for moving the light. In the meantime the shoals should be properly marked by gas buoys."

The re-establishment of Rock island light and fog signal, Isle Royal, Lake Superior, is also asked for; also immediate repairs to Spectacle reef light crib, Lake Huron, and a light and fog signal on North point, Grand Traverse bay, together with several gas buoys in that vicinity.

The lighting of the straight channel cut at Toledo is again brought to the attention of the board. The ship masters of the lakes in annual convention asked for eight gas buoys to properly mark the line of this cut. For the Sault river fifteen gas buoys are requested and Congressman Burton has been furnished with charts showing where they would prove serviceable. Other points where gas buoys are wanted are: Three on new shoals at Waugoshance, Straits of Mackinac, above referred to; one on Hog island shoal, Straits of Mackinac, and one each on Garden island shoal in the straits, Richard's reef and boulder reef to the west of Beaver island, Drisco shoal in Green bay and Manhattan shoal in "Death's Door" passage; also six in Northport bay, off Grand Traverse bay.

ESTIMATES FOR AIDS TO NAVIGATION.

The following estimate of appropriations for 1902 affecting Michigan and the great lakes have been submitted by the secretary of the treasury to congress:

Maintenance of lights on the channels of the great lakes, $4,000; light vessel on Southeast shoal, Point au Pelee passage, $4,000; keepers' dwelling, Portage light station, $3,500; fog signal at Holland pierhead range, which is the port of entry for Grand Rapids, $6,000; appropriation of $20,000 for light and fog signal station on or near Little Gull island, entrance to Green Bay. This was authorized in 1893, but no appropriation made. Establishing a light and fog signal station at or near Point aux Barques, $32,000, which will complete the system of coast lights along Lake Michigan. Enlarging keepers' dwelling, Windmill Point, Detroit river, $6,200; establishing additional lights in 20-ft. channel, Peches Isle range, $18,000; keeper's dwelling, Tawas light station, $5,000; light and fog signal station on Middle island, Lake Huron, $25,000, to make available the harbor of refuge behind the island; dwelling, Presque Isle light station, $5,000; reconstructing the foundation of the Spectacle reef station, $54,100; lens for Detour light station, $3,600; dwellings at Frying Pan island, St. Mary's river, and Point Iroquois, and Grand Marais harbor of refuge range, $14,000; moving light from Eagle river to Sand Hills, 12 miles, $38,000; moving light and fog signal at Portage lake ship-canal's pierhead, Lake Superior, from pier to end of breakwater, made necessary by government improvements at entrance to canal, $55,000; re-establishing lights to guide vessels into Rock harbor, Menagerie island, $15,000; light and fog signal on Rock of Ages, Isle Royale, Lake Superior, $125,000; tender, St. Mary's river, $75,000; relief lighthouse vessel, great lakes, $30,000; tender Portage lake and river, $15,000.

CABLE ACROSS "DEATH'S DOOR."

Congressman E. S. Minor will try to secure the passage of a bill in the present congress providing for an expenditure of about $10,000 for a cable across "Death's Door" (being the south passage into Green bay), connecting Plum island with the main land and also with Washington island. He has taken the matter up with Capt. Kimball, general superintendent of the life-saving service, and asks for assistance from the vessel interests towards securing passage of the bill. Congress Minor says:

"The life-saving station on Plum island was selected because it is partially protected from the surf to which it would have been exposed had it been located on the east side of Washington and Detroit islands. The fact is, as is well known to those acquainted with "Death's Door," that the location of this station is inside the lake shore line, and that Washington and Detroit islands are to the eastward, so that really this station is not in position to see or know anything about wrecks that are most apt to suffer because of a bad shore and shoals that are entirely shut out from Plum island where the station is located. At present there is no communication between Plum island and the main land, or between Plum island and other islands to the eastward of it. The Wisconsin Telephone Co. offers to extend a metallic wire from Sturgeon bay to the point of land nearest to Plum island to connect with this cable and then to wire over head, Washington island to connect with the other end of the cable, so that the station would be apprised at once of any mishap occurring to vessels on the east side of these islands and for some distance south of the "Door." Another great advantage would be that any vessel grounding on the many reefs to the eastward and southward of this station on Plum island, could promptly communicate with Escanaba or Cheboygan, thereby securing prompt relief, whereas at the present time it might take two or three days."

MR. DOUGLAS RESIGNS THE PRESIDENCY.

E. V. Douglas, who has been president of the Consolidated Lake Superior Co. ever since its formation, and who has been the most active influence in the organization and development of various enterprises owned by that company, announced last week to the board of directors that the condition of his health rendered it impossible for him to continue his occupancy of the presidency. Mr. Douglas still remains a director and retains all his large interests in the company, however. For a long time he has been suffering severely from the strain of overwork, and his relinquishment of business cares for a time is made imperative by his physicians. F. S. Lewis, vice-president of the company, was elected president to succeed Mr. Douglas. Mr. Lewis has been an officer of the Consolidated Lake Superior Co. and an active participant in all its affairs ever since the beginning, and the change in the presidency, therefore, will involve no change in the policy or in the conduct of its business. In addition to the acceptance of Mr. Douglas' resignation and the election of Mr. Lewis, the directors declared the usual quarterly dividend of 1¾ per cent. on the preferred stock, payable Dec. 15.

Congressman Burton has introduced a bill in the house of representatives to erect a fog signal and lighthouse on Middle island, Lake Huron, at a cost of $25,000; and also to erect a lighthouse and fog signal on Rock of Ages, Lake Superior, at a cost of $125,000.

PREPARING PLANS FOR ERIE CANAL ENLARGEMENT.

The Canal Association of Greater New York has requested Maj. Thomas W. Symons, United States engineer at Buffalo, and Abel E. Blackmar, counsel for the New York Produce Exchange, to prepare plans for the enlargement of the state's waterways, a policy approved by the two great parties in the last campaign. The association could not have selected two experts more eminent in canal enlargement and legislation. Maj. Symons' work during a considerable period of time has, of necessity, made him a close student of the questions involved in the establishment of perfect facilities for inland traffic by water. Mr. Blackmar has made a special study of it from the legal standpoint. In discussing the subject Maj. Symons said:

"It is true that Mr. Blackmar and myself have been commissioned by the Canal Association of Greater New York to look after this matter. The idea of the association is that we should draw up the canal bill for submission to the legislature this winter and we have agreed to undertake the task. Mr. Blackmar not only is attorney for the New York Produce Exchange, but he also was counsel for the Clinton investigating commission appointed by Gov. Roosevelt to inquire into the expenditure of the $9,000,000 appropriation and ascertain where mistakes were made in the use of that money and what additional expenditure would be necessary to complete the improvement under the $9,000,000 plan. I also have had considerable experience with the technical features of canal enlargement in this state, and it probably was because of our familiarity with the problem that the Canal Association of Greater New York designated us to undertake this task. We are to prepare the canal bill and see to it that this bill will reduce the possibility of fraud, extravagance, blunders and misunderstandings to the minimum.

"We will not have to prepare plans for enlarged canals. Those plans were all prepared under the $200,000 appropriation made recently by the legislature for the express purpose of selecting the best route for the canals and drawing plans for their improvement. There were three alternative plans for the enlargement of the Erie canal. We will decide upon one of those plans and draw the bill to provide for the enlargement of the Erie canal in accordance with that one plan. The legislature, of course, would be at liberty, if it thought best, to reject that plan and adopt one of the other two. It is our intention to confer with the state engineer and with Gov. Odell and other officials at Albany before we draft the bill so that everything will be satisfactory to them. When our work is finished and the bill drafted, it will be referred to Gov. Odell for his inspection, revision and approval, so that the bill as finally submitted to the legislature will be backed by the official commendation of Gov. Odell and the state engineering department. It seems to me that it is highly essential that the canal bill shall be right in every particular when it is submitted to the legisltaure, so that there will be no technical or legal details for the legislature to work out and thereby delay the early enactment of effective and safe canal legislation. We will have this bill prepared before the legislature is convened in January."

DEATH OF ALEXANDER GILCHRIST.

One of the famous old men associated with the development of the great lakes region passed away at Vermillion this week in the person of Alexander Gilchrist. He had been identified with the lake region since 1850, settling at St. Clair, Mich., during that year. He was born in 1820 at Goffstown, N. H., on a farm and spent his early manhood in farming and mercantile pursuits. In his twenty-ninth year he married Betsy Ruth Clough of Goffstown and in the following spring sought his fortune in Michigan. His first business in the new region was that of lumbering, which led to the acquisition of a sawmill at Marine City. He lived at Marine City until 1869, during which time he built several vessels and operated them on the lakes. Among the number were the schooner Yankee, bark Favorite, bark F. Morell and schooner Amoskeag. While his children were going to school he lived at Ann Arbor. In the spring of 1877 he moved to Vermillion and engaged with his sons in the lumber and vessel business. It was here that his son, Joseph C. Gilchrist, began the accumulation of a vessel fleet which has become, with one exception, the largest single fleet on the great lakes and probably the largest fleet in the world which is controlled by one man. Mr. Gilchrist retired about five years ago. He was the father of four children, one of whom, William, died in childhood. The other three survive him. They are Joseph C. and C. P. Gilchrist of Cleveland and Mrs. William J. Frey of Findlay, O. Mr. Gilchrist's wife died only about eighteen months ago, they having lived together for fifty-two years. The funeral was held from the late residence at Vermillion on Wednesday.

A COUPLE OF LAKE ERIE WRECKS.

Acting under instructions from the chief of engineers and from Major Dan C. Kingman, in charge of the Cleveland district, United States Assistant Engineer Wm. T. Blunt caused an examination to be made on Monday last, of the steamer D. F. Rose and barge A. Mosher, which were stranded in Saturday night's gale on Lake Erie. Two other vessels of the Rose's tow, the barges Wawanosh and Casey, escaped serious injury. Mr. Blunt says in a report of the trip of the United States steamer visitor to the wrecks: The Mosher lies on the peak of Starve island reef, headed about southeast and 150 ft. northerly from the winter buoy recently left by the lighthouse department in place of the lighted red can buoy. This red buoy is some distance northerly from the range of South Bass and Green island lighthouses, which range is considered as the northerly limit of safe navigation past this reef. The Mosher is apparently hung on the reef forward, while aft the hull seems to be working and is probably free. The topsail jib was stripped but the other canvas was roughly clewed up. No attempt has apparently been made to strip the vessel. As the vessel lies, it is rather a help than a menace to navigation as it clearly indicates the position of the reef, whereas the red spar might be hard to see. Should the vessel break up, however, it is quite likely that parts might drift into the south passage. The steamer Rose lies on the east shore of South Bass island, 1¼ miles northerly from the lighthouse. The position of this vessel is such as not to in any way endanger navigation. Owing to southwest wind, heavy sea, and treacherous waters, no attempt was made to examine either of these vessels in detail.

CARGO RECORDS, LAKE FREIGHTERS, 1902

The big freighters of the lakes carried their largest cargoes during the period of best water in midsummer. There is no probability of the records of August, which will stand for 1902, being exceeded in the few days of navigation still before the lake fleet.

The record 7,652 gross or 8,570 net tons of iron ore—is still held by the steel barge John Smeaton of the Pittsburg Steamship Co.'s (Steel Corporation) fleet. The largest vessels of the Steel Corporation fleet have in fact about equally shared the honors, the Smeaton's margin being very small, as will be seen by the following table of ore cargoes:

Name of Vessel	Date of Delivery	Loading Port	Port of Delivery	Gross Tons	Eq'valent Net Tons	Mean draug't ft.—in.
Barge Smeaton	Aug. 13	Two Harbors	So. Chicago	7 652†	8,570	18-6
Stmr. Elwood	Aug. 21	Two Harbors	Conneaut	7,642†	8 559	18-7
Stmr. J. J. Hill	Aug. 16	Two Harbors	Conneaut	7,626†	8,541	18-8
Stmr Edenborn	Aug. 16	Duluth	Conneaut	7 608†	8,522	18-8
Barge Manila	Aug 11	Two Harbors	So. Chicago	7,537†	8 441	18-6

† Includes the 1 per cent. above bill of-lading weight which the ship carries on account of moisture in the ore and on which no freight is paid.

The largest cargoes in grain and coal, as well as iron ore are shown in the following summary:

Iron ore—Steel tow barge John Smeaton, owned by Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 7,652 gross or 8,570 net tons, Two Harbors to South Chicago; steamer Isaac L. Elwood, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 7,642 gross or 8,559 net tons, Two Harbors to Conneaut.

Grain—Steamer S. J. Murphy, Donora Mining Co., Duluth, 269,000 bushels of corn, equal to 7,532 net tons, South Chicago to Buffalo; steamer Douglas Houghton, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 308,000 bushels of clipped oats and 60,000 bushels of corn, equal to 7,520 net tons Manitowoc to Buffalo.

Coal—Steamer I. L. Elwood, owned by Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 7,688 net tons anthracite, Buffalo to Duluth; steamer I. L. Elwood, Pittsburg Steamship Co., A. B. Wolvin of Duluth, manager, 7,388 net tons of bituminous, Cleveland to Duluth.

FISHING IN SAGINAW BAY.

"The shores of Saginaw bay are graced with the finest fisheries upon the great lakes," said George Peniman, the veteran fish dealer, at Saginaw. "This I can say, without fear of contradiction. I arrived in this vicinity some thirty years ago, and even at that time there was a whole lot of fishing going on here and a ready market for the product. Those were the days when whitefish could be gathered in almost by the carload at the mouth of the Saginaw river. Conditions have changed since then though, and now lovers of whitefish must seek them in deeper waters. Whitefish were driven from the mouth of the Saginaw river by the refuse which was thrown into the stream by the industries on its shores. I can account for the scarcity of sturgeon in but one way, and that is that too many of them were pulled from the waters at the time when they were abundant. Why, sturgeons used to bring $1.00 each. Now they command $5.00."

"I don't exactly know," he continued, "how many hands the fish industries employ, but I do know from experience that there is not a better class of men nor any more satisfied with their surroundings and conditions than the fishermen of Saginaw bay. There is a constant demand for our fish, and we can truthfully say that outside of the Green bay district, we are the only winter fishing quarters on fresh water where the product finds a ready market during the cold months. Saginaw bay fish are shipped to all portions of the United States and are always in demand."

Capt. Barrett, who was compelled a few weeks ago to leave his vessel, the schooner Tokio, on account of illness, died in Port Huron a few days ago.

LONGSHOREMEN'S ASSOCIATION MAY STAND ALONE.

Secretary-Treasurer Henry C. Barter of the International Longshoremen, Marine & Transport Workers' Association has returned from New Orleans after attending the national convent of the American Federation of Labor, with President Daniel J. Keefe representing the longshoremen and transport workers. He says that although the American Federation of Labor did not grant a renewal of the charter of the longshoremen under the new name adopted at the Chicago convention, they were not beaten by any manner of means and the big fight now on is between the Seamen's union and the association he represents. The seamen lost the marine cooks whom they sought to place under their jurisdiction. This was one of the mooted questions which came up. The cooks were left under the jurisdiction of the Hotel & Restaurant Cooks Association and the Bartenders' union. A conference between the seamen and longshoremen will be held within ninety days, and at this conference two representatives of the Longshoremen and Transport Workers' Association will meet two representatives of the Seamen's Union, and these four will select a fifth member of a board of arbitration, which will decide under which association the marine engineers, freight handlers, wheelsmen and watchmen are to be classed. While Mr. Barter would not commit himself and would not say anything which might interfere with an impartial decision of the arbitration board, it is inferred that the American Federation of Labor feared to give his association jurisdiction directly over the many allied labor interests which the International Longshoremen, Marine & Transport Workers seek to affiliate under their charter. There is still a possibility that the longshoremen and transport workers will break away from the American Federation of Labor. The association as it now stands controls practically every trade and class of labor in connection with freight handlers on the lakes and coasts and there is a feeling that it is strong enough to stand alone and not have any connection with the American Federation of Labor. In none of the big fights of the past has the American Federation of Labor assisted the longshoremen and a break is not altogether unlikely.

WORK ON CANADIAN CANALS.

Hon. A. G. Blair, minister of railways and canals, and Mr. Collingwood Schreiber, deputy minister, are back in Ottawa from an official inspection of the St. Lawrence, Trent and Welland canals. Work on the canals generally is pretty well closed down for the season. At Cardinal the work of stoning the canal stops will be finished this year. On the Trent canal, Messrs. Corry and Laverdure have finished their contract, and the Dominion Bridge Co. is now constructing the lift lock at Peterboro. This will be the only structure of its kind in Canada. Indeed, there are but three like it in the world—at Les Fontinettes in France, La Louviere in Belgium, and Anderton in England—but they are not half the size of the Peterboro lock. The latter might not inappropriately be termed a marine balance elevator. It is designed to transfer vessels from one reach of the canal to another, so as to overcome a difference in level of 65 ft. This will be done by a single lift. The lock consists of two watertight steel chambers or boxes, each 33 ft. wide and 140 ft. long, holding 8 ft. deep of water in the clear and closed at the ends by gates. Similar gates also close the ends of the canal reaches. These chambers are carried by means of heavy trusses supported on top of two hydraulic rams which work in two steel watertight presses, one under each chamber. When the chambers are at a standstill, one chamber is up, at a level with the upper reach, the other down, and at a level with the lower reach of the canal. Owing to the upper chamber having 10 in. more water in it than the lower, it has 100 tons more weight. The vessel having entered the chamber, connection with the canal reach is cut off by means of gates, and the upper chamber descends while the lower one ascends till they have changed positions. Then watertight connection is made between the chamber and the reach, the gates are opened and the vessel passes on into the canal. The time required to pass one vessel, or two vessels going in opposition directions, will be twelve or fifteen minutes. The chambers, rams, presses and the tower are of steel, weighing in all about 1,500 tons. The total load on the foundation of the presses will be 3, 000 tons. On the Simcoe-Balsam lake division of the Trent, Messrs. Brown & Aylmer and Mr. Onderdonk have about completed their contracts. On the section next to that, Messrs. Larkin & Sanger will require next season to finish the contract of Messrs. Brown, Love & Aylmer, between Larkin & Sangster's section, and Lake Simcoe will also be finished next season.

On the Welland canal the minister and deputy inspected the work of erecting end piers for the two new bridges which are to be constructed to swing the full length of the canal and take the place of the present bridges, which are swung upon piers in the center of the canal. The latter piers will be removed and so give additional freedom to navigation. All the old central swing bridges on the Welland, about a dozen in number, will be similiarly replaced as soon as possible.

The Willis Creek Coal Co. will build a modern coal dock for fueling steamers at the foot of Twenty-first street, Detroit.

CAPT. DAN F. MILLER'S BRAVE ACT.

The recent death of Capt. Dan F. Miller of Grand Haven, Mich., was greatly mourned by the entire community. He was a very brave man and there was one act, at least, of unusual courage to his credit. It is recalled that Nov. 15, 1880, was one of those mild, peaceful days, not unusual at that season in the lake region. But many times they prove the forerunners of autumnal gales of unusual violence. Late in the afternoon the small schooner Driver left Chicago, Capt. Dan F. Miller in command. The captain's brother, Dave Miller, was first mate, and in the crew were one Pat Daily, a middle aged sailorman, and a boy named Wilson. There had been another member of the crew, but when the Driver arrived in Chicago a few days before, loaded with lumber, this sailor had gone on a protracted spree, and Capt. Miller, knowing not where he was, sailed away without him. There was a gentle southwest breeze after leaving Chicago, and captain and crew were certain of making Grand Haven harbor early the next forenoon. The course from Chicago led diagonally across Lake Michigan, due northeast. Capt. Miller went below early, leaving his brother at the wheel. At 10 o'clock the latter noticed that the wind was changing and was then about due west and increasing in force. At midnight it was in the northwest and blowing a gale. Capt. Miller and the members of the crew were called up from their bunks below. He saw at once it would be folly to think of making Grand Haven in the morning, for while the harbor is the widest and safest on the east shore of the lake, he trusted more to the seaworthiness of his vessel, in riding out the storm in mid-lake, far from the treacherous bars and sandy beaches of the lake shore. Capt. Miller's first care was in making ready his vessel, which was a staunch little craft, built only three years before. The crew soon had the sails adjusted to his liking, though not without great danger, for seas were constantly sweeping over the schooner, washing the boat fore and aft, and in the hurricane which prevailed, it was only with difficulty that the Driver was kept out of the trough of the sea. Captain and crew were alert all that night. In the morning, at daybreak, as far as the eye could see, were white capped waves, which threatened to engulf the little vessel at any moment. At 10 o'clock in the forenoon Capt Miller ventured to put about and sail before the gale. He estimated that within three hours the storm would have spent its force, and he would be able to make the run to Grand Haven without fear. During all this time not another vessel had been sighted, but at noon, Pat Daily, who was at the wheel, sighted a big steamer 5 miles away, and a little north of the schooner's course. In the uncertain light he could tell little of the vessel, but hastily picking up the schooner's glasses, he saw a flag of distress displayed from the short foremast. Dailey informed Capt. Miller and the rest of the crew.

Despite the fact that the gale had not diminished, Capt. Miller had the Driver again put about, at the imminent risk of being swamped by the mountainous seas. After an hour of working into the gale and when about a third of a mile from the disabled steamer, Capt. Miller cried out:

"My God, men, that barge is the H. C. Akeley of Grand Haven! Must we lie here and see our townspeople drowned like rats before our eyes without giving a helping hand?

Over the raging seas which separated the sinking Akeley and the little schooner, the crew of the big barge could be seen huddled on the leeward side of the forward cabin. It was plain to be seen that the boat was past help. Already the steamer was rapidly settling at the stern. The fires were out, the smokestack had been carried away, the after cabin, and, in fact, nearly all the upper works of the Akeley had been demolished by the seas. Their small boats had been carried away and they could not save themselves. Capt. Miller was a man of few words, but for physical activity he was noted.

"Boys," he said, addressing the crew, "fifteen or twenty men, all of them neighbors, are across the water there. God knows that in half an hour the Akeley will be gone. Are we going to lie here and see this happen without doing something? It's life or death, of course, but I will take the Driver's yawl with the men of you who will go with me, and take the chance of saving some of those poor fellows."

Without a second's hesitation Dave Miller stepped forward, but Pat Daily was before him, and pushing Dave aside, said:

"One man in a family is enough in this business."

The Driver's yawl was hastily lowered, Miller and Daily pulled away from the schooner when the first opportunity came, between the big seas. There were no sentimental handshakings or farewells said, but the two men left on the Driver never expected to see their comrades again. They watched with anxiety the long and dangerous journey their shipmates were taking. Often the yawl with its human occupants was lost to sight, between the giant waves, only to come in view again on the top of some great breaker. Miller and Daily were not particularly good oarsmen, but they exhibited rare judgment on this occasion, and twenty minutes later, every minute of which they thought would be their last, they reached the Akeley's side, and made fast to the lee side of that rapidly sinking ship.

The crew of the Akeley had watched the journey of the two lifesavers with the breathlessness of dying men. Capt. Stretch of the steamer refused to leave his boat and five of his crew de-

cided to remain with him. Between the chances of drowning from the little yawl or going down with the Akeley, they preferred to chance it with the latter, hoping against hope that some large steamer would come along, and give them aid. There was no time to lose. Capt. Miller secured a long pole, with which to steer the yawl, and with Daily and eight of the Akeley's crew, again put out across the angry waters for the Driver.

Of that journey little can be said. Miller stated afterward that nothing but Providence kept the small and overloaded yawl from swamping. How they did it they did not know, but finally the Driver was reached and rescued and rescuers were pulled aboard. Capt. Miller wanted to turn about at once and return for those still aboard the Akeley, but in the exhausted condition of all, it was impossible to think of this for the time, and five minutes later the Akeley's bow shot upward, and six brave men, Capt. Stretch among them, went down to graves in the element which had furnished them a livelihood, and now was to be their resting place for all time.

Shortly after the sinking of the Akeley the gale subsided and the next morning the Driver reached Grand Haven. The telegraph, a few hours later, told the country of the brave rescue of eight of the steamer Akeley's crew by the captain and a sailor of the little schooner Driver. A great public meeting was held in the town, at which Miller and Daily, very unwillingly appeared, and both were presented with handsome purses. Congress at its next session conferred gold medals upon them for their heroism.

Daily is still following the great lakes, one of those homely, forgotten heroes, whom the people honor, and as soon forget. Dan Miller followed the lakes until his recent death, a mild and unassuming man. He could very seldom be induced to tell of the experiences of the day which showed the heroic in his make-up, although close friends know that the gold medal which had been given him by the national congress, was his most prized possession, and he died as he lived, one of the bravest of the brave.

IMPROVEMENTS TO LAKE WATERWAYS.

The annual report of improvements in the connecting waters of the great lakes is an interesting document when analyzed. The present commerce passing through Sault Ste. Marie canal is about forty times that of 1870, six times that of 1886 and four times that of 1892. During the fiscal year there were removed from the St. Clair river section portions of three shoals at St. Clair, Stag island and Grand Pointe, the total amount of material dredged being 86,753 cubic yards. The result of the work was to provide a clear depth of 21 ft. In the St. Mary's river section there were found two new shoals near Frying Pan island and Crab island, both near the direct line of navigation, with less than 21 ft. depth. They were mapped and reported to the lake survey office. The unexpended balance of previous appropriations will suffice, the report says, for all work required to complete improvements contemplated by the present approved project. Since the opening of the Poe lock on Aug. 3, 1896, to June 30 of this year $3,996,948.25 has been expended in various improvements. The piers were rebuilt and extended and the canal itself deepened.

In the Detroit river before improvements the shallowest part of the channel was at the Lime-Kilns crossing, where the normal depth was 12½ to 15 ft. over a bottom of solid rock. The first projects of 1874 providing for a winding channel of at least 20 ft. over 300 ft. in width. This was modified in 1883 so as to somewhat straighten the channel; again in 1886, to give 400 ft. width, and in 1888 to give 440 ft. width. The general depth above and below the Lime-Kilns was 20 ft. or more, but the bed of the river was studded with large boulders and rocky shoals which limited the safe navigable depth to scant 15 ft. through a distance of about 12 miles. A new general project of improvement was thereupon adopted in 1892 for the removal of all obstructive shoals between the city of Detroit and Lake Erie, with a view to obtaining a through channel with at least a width of 600 ft. and a navigable depth of 20 ft. at a total estimated cost of $1,554,500, as adopted by the river and harbor acts of July 13, 1892, and March 3, 1899 and as approved by the war department at various dates from 1892 to 1899. The river and harbor act of June 13, 1902, appropriated $500,000 and authorized work up to $1,250,000 more for the commencement and prosecution of the new 1900 project, so as to provide 21 ft. minimum low-water depth over 600 ft. minimum width of channel from Lake St. Clair through Detroit river to Lake Erie. The total expenditure on the improvements up to June 30 of this year was $1,266,-125.66. As a result of the work done to that date a channel ranging from 300 to 600 ft. in width was obtained, in which the least depth at mean stage of water was 19 ft., and from 19 ft. to 21 ft. through most of the distance. Work was also done at the head of the river.

The contracts already in progress under old appropriations will probably be completed in 1903. The new work under the authority and funds of the act of June 13, 1902, will be started either this fall or early in 1903 under new contracts, and $450,000 will be needed under the sundry civil act of 1903 for next year's work.

The yacht Starlight has been sold by Frank V. Eastman of Benton Harbor to B. C. Lindley of Chicago for $2,000.

DEVICE FOR UNLOADING COARSE CARGO.

The Lake Shore Stone Co. of Milwaukee, owners of vast quarries at Stone Haven, 33 miles north of Milwaukee, have equipped the steamer Hennepin with a modern and successful outfit for discharging crushed stone from her hold onto docks. There are two longitudinal hoppers occupying all the space between the forward and after bulkheads, 165 ft. in length. Underneath each hopper is placed a 24-in. belt conveyor. Each of these two conveyors discharge into a common hopper, which discharges onto a 32-in. belt conveyor that starts from the after bulkhead and runs up through the deck at an angle of 26° to a height of 10 ft. above the deck. This conveyor discharges onto an outboard conveyor 32 in. wide, the lower end of which rests upon a turntable bolted to the deck. This conveyor is hinged on the turntable and when swung outboard can be raised or lowered to the angle of inclination desired to deposit the crushed stone in piles on the dock. The outboard conveyor is handled by a boom attached to the after mast.

When it is desired to discharge the crushed stone trap doors are opened in the hoppers, the stone drops into the traveling hoppers over the lower belt conveyors and is conveyed to the common hopper, into which it falls; thence onto the 32-in. belt, which in turn deposits it onto the outboard conveyor, and this latter may be swung to port or starboard, delivering the stone in piles on the dock, or into cars or wagons.

The conveyors are operated by a 40-H. P. upright engine in the hold, steam being taken from the main boilers of the vessel. The capacity of the conveyors is over 400 tons of stone per hour, and as the capacity of the Hennepin is 1,250 tons it will be seen that the unloading of her cargo can be accomplished in about three hours, and with no manual labor except that involved in opening the hopper traps and pushing along the traveling hoppers.

This system was devised by Mr. F. N. Merrill, general manager of the Lake Shore Stone Co., who believes that ultimately iron ore and anthracite coal will be handled in this manner. The apparatus works perfectly with no stops or delays; it is simply a question of opening the slides with the machinery doing the rest. The stone is loaded into the Hennepin through spouts, which discharge the crushed stone from an immense bin on the end of the pier at Stone Haven. It takes about three hours to load 1,250 tons of stone and it is consequently possible for the Hennepin to make a round trip between Stone Haven and Milwaukee in sixteen hours including time of loading and unloading.

SIXTY YEARS IN THE IRON BUSINESS.

Joseph T. Ryerson & Son of Chicago have issued a little book in commemoration of the sixtieth birthday of the firm It is replete with historical matter. Great interest attaches to the illustrations of the old Ryerson forge near Bloomingdale, N. J., or rather all that is left of the forge. The name of Ryerson has been associated with the iron and steel business of America since its inception. This old forge was established about 1815, using ore which came from mines partly owned by Martin J. Ryerson, Ringwood, N. J. When Joseph T. Ryerson went to Chicago in 1842 he found it a city of 6,000 persons. It took him eight days to make the journey from Philadelphia to Chicago, staging it a great part of the way. He prospered but his business was reduced to a conglomerate heap of molten metal by the fire of 1871. However, he attacked the business with greater energy than ever and was speedily successful. The little book is especially valuable for the information which it contains and is one of the volumes put out by the trade that will be kept for its bearing upon American history.

PROPOSED LIGHTING OF THE ST. LAWRENCE.

Hon. Mr. Prefontaine, minister of marine of the Dominion government, says of the proposed lighting of the St. Lawrence: "The examination I have made of the channel has convinced me that there is no reason why it should not be so lighted at night as to make it as navigable during the hours of darkness as it now is in the day time. I intend to ask my associates in the government to permit me to place a sufficient amount in the estimates for this purpose, and I have no doubt but parliament will be quite ready to vote the money which is required. I expect that the work of perfecting the lighting of St. Lawrence channel will be completed before the end of the coming summer."

Although the opening exercises in connection with the new water power canal on the American side of the river at Sault Ste. Marie were held a month ago, the canal was not officially opened as far as the United States government is concerned until last week. Maj. W. H. Bixby, United States engineer in charge of the district, received telegraphic advice from the secretary of war, through the engineers' department, authorizing the official opening of the canal in accordance with the recommendations of the board of engineers concerning the use of the waters of Lake Superior so that such use will not interfere with the levels of the lake or the rights of navigation. As a result of the announcement the Consolidated Lake Superior Co., Francis H. Clergue's enterprise, may take its supply of water through the new canal as long as the lake levels are maintained.

IMPROVING RANGE LIGHTS ON ST MARY'S RIVER.

Capt. Lansing H. Beach, lighthouse engineer, is now at work upon plans for important revisions and improvements in the system of range lights and day marks along St. Mary's river and the upper approach to the locks at Sault Ste. Marie, and these are to be installed early in the spring.

There are several places along the St. Mary's river between Detour and Whitefish point where it is difficult to navigate even under the best conditions, but a recent inspection by Capt. Beach has brought out the fact that in some places the day marks cannot be distinguished until a vessel is nearly upon them, and even then it is a difficult matter for a master to pick them up, even though he knows their location and is familiar with the course. The most important change to be made by the lighthouse engineer is on the Vidal shoal range above the locks at the Sault. At the present time the front light is a fixed white with a red flash every forty seconds. The rear beacon is a white electric light in a red globe. It is not pronounced enough and sometimes gives the appearance of a dirty yellow. The front light is just at the height where it is on a level with the arc lights along the bank of the canal and from a distance is often confused with them, making it almost impossible, in the fog, haze and smoke which often obstructs a clear view, for a vessel master to distinguish anything but the red flash.

Capt. Beach intends to put another 11-ft. cast-iron section at the base of the present front light and bring it above the canal lights. A white building will replace the skeleton structure which now comprises the rear range. It will be painted white and show up better than the present range, which is projected against the International bridge and the hills and houses on the Canadian side.

The Pilot island range, at the upper end of Mud lake, is also to be changed. This is 7 miles long and requires the very best marks in order that they may be of service in this stretch of water. The structures now doing duty are almost tumbling down. They will also be replaced as soon as possible. They will also be shifted to the west. As they now stand they make the channel too close to the east bank. There is plenty of good water to the west of the present range.

The rear beacon on the Winter point range is so located and its construction is such that in daylight it cannot be seen until a vessel is almost upon it. On account of the many boats and the shallow spots along the Vidal shoals range in particular, Capt. Beach said it was absolutely necessary that new and modern ranges be given to the lake navigators, as they cannot feel their way along as in an open lake if they have not got the ranges to run upon. Capt. Beach will make the lights of the fourth order, those now doing duty being of the fifth order.

STORAGE TO BE CHARGED TO THE VESSELS.

Buffalo, Dec. 3.—It is about agreed among the Buffalo elevator interests that vessels bringing grain here at the close of navigation this season, to be stored in the vessels, shall, if they tie up at elevator docks, be charged dockage equal to ½ cent per bushel for the privilege of holding their grain in storage alongside of the elevator docks. This seems to anyone but an elevator manager a bad business proposition, as it is well known that every fall for a number of years past grain has arrived at Buffalo just before the close of navigation faster than the elevators could possibly take care of it. The receipts of grain this fall have been unusually light, therefore the elevator blockade is not as great as usual at this time of year. Notwithstanding this fact, generally speaking, the elevators are filled with grain up to the limit of their fire insurance, and that being the case, why they discourage vessels from bringing grain here to winter is past the comprehension of anyone who cannot appreciate the merits of such a dog in the manger policy; the more so as the elevator situation now is almost entirely controlled by the grain-carrying railroads, and an outsider would think that the more grain afloat here in the harbor at the close of navigation, the better for the interests concerned, as before the opening of navigation another season the elevators will have the grain to handle and the railroads have it to carry. Of course it is possible that there is some thing in the elevator conditions which the outsider cannot appreciate.

FAMOUS CANADIAN MINING SUIT.

Despatches from Canada refer to the judgment of the imperial privy council of England in a famous mining suit that will probably prove of interest to readers of the Review on account of the drift of capital from lake cities of the United States to mining properties of Canada. The case is that of the Ontario Mining Co. against Seybold. The appeal of the Ontario Mining Co. to the privy council was dismissed with costs. The action related to the famous Ophir property on Sultana island, Lake Superior. It was brought by the Ontario Mining Co. to set aside patents issued by the Crown in right of the Province of Ontario granting a two-thirds interest in the property to the defendants, Messrs. E. Seybold of Ottawa, E. B. Osler, M. P., of Toronto, and others. It is noteworthy, in connection with the judgment, that the conclusions of law upon the subject of "The Crown Title of Lands in Ontario," as stated in McPherson & Clark's "Law of Mines in Canada," the recognized text work on Canadian mining law, has now been fully confirmed by the highest court in the realm.

The decision establishes the complete control of the Province of Ontario over what was formerly known as the disputed territory, but the province did not put forward any claim to interfere with Indian reserves when properly set apart or constituted with the approval of the province. The case was decided in the first instance by Chancellor Sir John Boyd, whose judgment has been sustained throughout all the litigation which has extended over a series of years, and come not only before the Ontario courts, but also before the supreme court of Canada during the last few years, and in these various courts from time to time many eminent counsel have been concerned, including the Hon. Edward Blake, Mr. Christopher Robinson, the late Mr. B. B. Osler, Mr. W. D. McPherson of Toronto, Mr. J. M. Clark, Mr. Wm. Laidlaw, Mr. G. F. Shepley, and Mr. James Bicknell.

HIS CANAL BOAT EXPERIENCE.

The old citizen appears to have been reminiscent in Buffalo during the inclement weather of last Saturday.

"I don't just remember the year," said he, "but it was somewhere in the '60's, that I had my first, last and only experience as a canal boat owner and captain, and I made but a single trip, the Belle, the boat that I operated, carrying the last cargo that reached Troy from Buffalo that season. It was the last day of November. I was a young man, but had engaged in the transportation and shipping business to some extent, and had a pretty good acquaintance among the men who made their money along the water front and the State ditch. I went down to my office early in the morning, and I hadn't been there but a few minutes when a friend of mine, an extensive shipper, came in.

"'Got any money to invest?' he asked.

"'Yes, if the investment's any good,' said I. 'What you got to offer?'

"'Why, you see, it's like this. I want to get a load of timber to Troy before the canal is blocked and I thought you could help me out. Down at the Commercial street slip is a boat called the Belle, and her owner wants to sell her. He'll take $1,800 cash for her, and she's dirt cheap. Go and buy her, and I'll give you a cargo to Troy that will nearly pay for her. Besides, I don't believe you'll have any trouble to dispose of her when you get to tidewater.'

"Well, the upshot of the matter as that I bought the boat, had her taken around to the timber dock, and next day went aboard a canaller for the first time as captain. It was just such a day as this—pleasant and warm as you could ask, and I was counting on a quick run and an easy time of it. All the same, I had prepared myself for the worst that might happen. In my kit which followed me aboard were woolen shirts and heavy clothing, rubber boots, an oilskin coat and a sou'wester. I needed 'em all before we finished the trip. Everything went easy until we reached Tonawanda, along in the afternoon and then the wind swung 'round to the nor'ard and it began to spit snow. When we reached Lockport the weather was as nasty as it could well be. Snow and rain fell together and the towpath was ankle deep in mud. An extra $5 to the lock tenders helped things wonderfully and we got through in remarkably short time, bad as the conditions were. I saw that we were in for it, but I determined that I wouldn't be beaten if hard work and a judicious use of money could pull us through. At the first relay station I had an extra team of horses put onto the tow line and hurried them along almost at a trot. People along the route and at the towns through which we passed looked at us as though they thought us crazy. All the time the snow kept falling and the canal was becoming clogged with it. I took my regular trick driving and at every station changed my tired teams for fresh animals. Boat after boat, less well provided with motive power, we passed. Their captains had given it up. Either they would wait for a turn of the weather for the better or would remain where they were for the winter. On the morning of the last day a third team was added to the line and just before dark we were floated through the last lock and the Belle tied up at the dock where her oak timber was to be unloaded. Then, nearly dead for sleep, tired as I had never been before in my life, I pulled off my muddy clothes and turned in. It was scarcely daylight next morning when one of the men pounded on the cabin door. A man wanted to see me. I supposed, of course, it was the consignee and slipping on my trousers, without coat, hat or boots, I stepped out into the little gangway between my own and the men's quarters. An entire stranger gave me good morning and abruptly asked:

"'Are you owner of this boat?'

"'I am, sir.'

"'Want to sell her?'

"'Yes, I will sell her.'

"'How much?'

"'Well,' said I, 'right here now as I stand in my stocking feet I'll take $1,800 cash for her.'

"'What'll you ask for her when you get your boots on?'

"'Can't tell just exactly,' I answered, 'but I might want $2,500. She's free and clear; nobody has a dollar's claim against her.'

"'Well,' he says, 'I think I'll buy her with your boots off. Here's $500 to bind the bargain and I'll meet you at Lawyer

White's just down the street here a block, at 10 o'clock to make the transfer and pay you the balance.

"I had breakfast, then went out and found the consignee, made my report, and collected my freight. At 10 o'clock I kept the appointment at the lawyer's, legally transferred the Belle to her new owner, and took the afternoon train back to Buffalo. When I went back to the boat after completing the sale, after my clothes, the Belle was surrounded by ice 6 in. thick and her new owner wasn't able to move her until the following spring. That's the way the last boat of that season was taken through and that's how I cleared a clean $1,500."

AROUND THE GREAT LAKES

It is announced that the passenger steamer Tionesta, building at the Detroit yard for the Anchor Line, will be launched Dec. 13.

The new fire boat being built for the Detroit fire department by the Jenks Ship Building Co., Port Huron, was launched last Saturday afternoon.

Owanno is the name given by the White Star Line of Detroit to the fast passenger steamer which they purchased recently for Detroit-Toledo service and which was known as the Pennsylvania when running between Erie and Buffalo.

H. C. Hamilton, solicitor for the Clergue syndicate, says that the steel rail works at the Sault are now turning out from 400 to 500 tons a day, and will soon be able to turn out 800 tons. This would more than supply the whole Canadian demand.

Silas Hunter, well known among lake engineers, has prepared words and music of several songs of a popular kind from an engineer standpoint. He has had them published more on account of interest shown in them by his acquaintances than with a view to profiting by the sale of them.

The schooner Celtic, in tow of the steamer Runnells, broke away from the steamer in the gale Saturday night when on the north end of Lake Huron. The steamer searched for her but without success. The Celtic carried a crew of eight persons. She was owned by Spence Bros. of Cleveland.

About Dec. 10 the fog signal in Plum island, near range light station (Porte des Morts passage into Green bay) will be changed from a first-class steam siren to a 10-in. steam whistle. The characteristic of the signal will remain unchanged—blast of 3 seconds' duration with silent interval of 17 seconds.

The Detroit & Cleveland Navigation Co. received formal demand a few days ago from the Seaman's Union for an increase of pay to $50 per month for lookouts and wheelsmen. Upon consulting President Livingstone of the Lake Carriers, A. A. Schantz of the D. & C. Co. found that the Lake Carriers had agreed to pay the rate demanded and in consequence the D. & C. employes will get the higher pay for the remainder of the season.

When the steamer Darius Cole comes out next spring she will be an entirely different craft. Feathering wheels are to be given her in place of the old-fashioned buckets, and trim tanks added besides. The woodwork will also be so nearly replaced as to make her practically a new boat and capable of a great deal more speed than when she ran on Lake Michigan. The work is being done under the superintendence of the Star-Cole line at Detroit.

A remarkable record was made by the two big side-wheel steamers of the Cleveland & Buffalo Line with the close of their season last Saturday night. The City of Buffalo made 110 round trips, covering 39,600 miles, and the City of Erie 108 trips, with a distance of 39,340 miles. Both boats arrived on time every day, with the exception of two trips when they were 2½ hours late. On both of these occasions delay was caused by high wind, at one time blowing 65 miles an hour as the City of Erie quitted port. Not a life was lost from either boat or a passenger or employe injured.

Only 21,002 tons of hard coal was moved out of Buffalo by lake while the miners' strike was on during October. An effort was made to move some coal during the latter part of November and an aggregate of 291,885 tons was shipped, most of it in the last few days of the month. With the high freights now offered, in order to get off as much coal as possible before the lakes freeze up, the shipments during that part of December in which the vessels are moving will be very large in comparison with other parts of the season, but only a very small portion of the coal that is wanted in the northwest will be moved.

It is not often the Great Lakes Towing Co. shares its work with an opposition line, but when the big side-wheel steamer City of Erie went into Buffalo port one day last week she was in tow of a trust and an independent tug. The C. & B. boats tow exclusively with the Great Lakes tugs, but when the Erie arrived outside the harbor only one trust tug was there to take her line. A heavy wind was blowing at the time and Capt. McAlpine decided it safer to have two tugs take him to his dock in Buffalo river. The Independent Towing Co.'s tug Connell was close by and she took a line on the side-wheeler. Thus it was that two rival tug companies worked on the same job.

Memories of the days when Chicago and New Buffalo were rivals for control of the trade of Lake Michigan and of the west are recalled by the announcement of an auction of government land next month. Sixty years ago indications were that New Buffalo would outstrip Chicago in importance and become a metropolis. In preparation for the growth the government selected a piece of ground at the junction of Galieu river and Lake Michigan and declared it the New Buffalo lighthouse reservation. But trade refused to obey the dictum of the government, Chicago boomed, and in a few years New Buffalo was known only as a trading station where the sands of the Michigan and Indiana shores were joined. The New Buffalo lighthouse was never built and the government is preparing to release its hold of the chosen site. The sale will be held Dec. 16.

The Steamer Owego was considerably damaged in her mix-up with the steamers Chili and H. B. Tuttle at the Lime-Kilns crossing a few days ago. Her stem was bent out of shape and a number of plates were buckled, causing a leak in her forward compartment. She steamed up to the yard of the Detroit Ship Building Co. and a cursory examination was made. It was decided to construct a cement bulkhead where the plates were damaged so that the vessel could proceed with her 2,000 tons of merchandise. She will be docked at Buffalo. About 20,000 bushels of wheat were lightered off the Chili by the T. F. Newman. Patches were placed over the damaged plates and she was pulled off the beach where Capt. Gibson ran her to avoid sinking. F. G. Rogers of Buffalo, chief engineer of the Union Steamboat Co. owner of the Owego, said that an estimate of the Chili's damage placed it at between $3,000 and $4,000. Repairs will amount to $8,000.

The revenue cutter Fessenden went into winter quarters at the foot of Campau street in Detroit last week. Capt. Moore and Chief Engineer Dally remain in Detroit. Lieut. Reed goes to the Gresham, at New York, and Lieut. Wolf to the Windom, at Baltimore. All of the officers expect to be back on the Fessenden on the opening of navigation next spring. Next season will see the revenue fleet on the lakes considerably augmented. There are now but two cutters on the lakes, the Fessenden stationed at Detroit, and the Morrell, stationed at Milwaukee. The new cutter, the Tuscarora, lately completed at the Trigg ship yard, Richmond, will be ready at the opening of navigation. It is expected she will be stationed at Milwaukee, and look after Lakes Michigan and Superior, while the Morrell will go to Ogdensburg, N. Y. The revenue tug Mackinac, building at Baltimore, will come up about the same time and will be assigned to duty at the Sault. This will make the largest fleet of revenue cutters that has been on the lakes since 1871, when there were ten boats in the service.

An 800-ft. extension of the northwest pier of the approach to the ship-canal is the latest piece of work which has been decided upon by the government authorities at the American Sault. This work, which will be carried on at the same time with the widening of the approach to the locks, will make the western opening to the ship-canal over 900 ft. wide. The purpose of the improvement is to give additional mooring room for the boats that may have to tie up at the piers awaiting their turn to lock through. The beginning of the widening of the approach will be made at the jog in the present waterway, just above the Poe lock. From that point the new bank to the canal will run in a direct line to the foot of the northwest pier. This will give the canal a width of about 389 ft. at the swing bridge, and as stated, 900 ft. at the entrance from above. This will leave the pier for the swing bridge on a small island in the middle of the canal. The width on the north side of the bridge will be about 115 ft., while the width on the south will, of course, remain as now. The entire work as contemplated will cost about $1,000,000 the bulk of which is available from unexpended balances.

MECHANICAL DRAFT PLANT FOR ST. LOUIS FAIR.

The mechanical draft feature of the Union Electric Light & Power Co.'s plant, which will be used for lighting the exposition grounds at St. Louis, will be an installation of unusual interest to engineers. The plant is to be equipped with both forced and induced draft apparatus, which is unusual. A mechanical draft plant usually is either of the forced or induced draft type, but in this case both will be used. There will be twenty-six boilers of 700 H. P. each, and they will be equipped with automatic stokers. Fans will be used for the forced draft, and the boilers will also be operated under induced draft. The forced draft fans will be four in number, of the full housing type, size 160 in. They will be driven by 10x10 vertical engines, direct attached. The induced draft fans will be two in number, of a size quite in keeping with the basis upon which the exposition is being built, the wheel diameters being so large as to be seldom met with in mechanical draft engineering. Each of the induced draft fans will be of the full housing type, size 230 in., and will be driven by 9x10 double-cylinder, double-acting upright engines, this type being selected to secure maximum power in limited space. The Buffalo Forge Co., Buffalo, N. Y., is building all the fans and engines for this equipment.

The Eastern Steamship Co. has contracted with the Harlan & Hollingsworth Co., Wilmington, Del., for the construction of a steel steamer of the Gov. Dingley type. She will be 325 ft. long and designed for a speed of 20 knots.

NEW TYPE OF AIR COMPRESSOR.

A new type of air compressor, built at the Franklin, Pa., air compressor works of the Chicago Pneumatic Tool Co. is here shown. This machine is designed to meet the growing demand for higher efficiency in air compression that naturally attends the steadily increasing adoption of pneumatic machinery in all branches of industry. It is known as the class C. S. C. pattern, designed for a delivery air pressure of 100 lbs. per square inch, with a steam pressure of 100 to 150 lbs. This compressor has low-pressure steam cylinder of 31-in. diameter, high-pressure steam cylinder of 20-in. diameter, low-pressure air cylinder 28-in. diameter and high-pressure air cylinder 16½-in. diameter, all cylinders being 24-in. stroke. The capacity of the compressor is 1,710 cu. ft. of free air per minute when operated at 100 revolutions, or 2,062 cu. ft. at 120 revolutions.

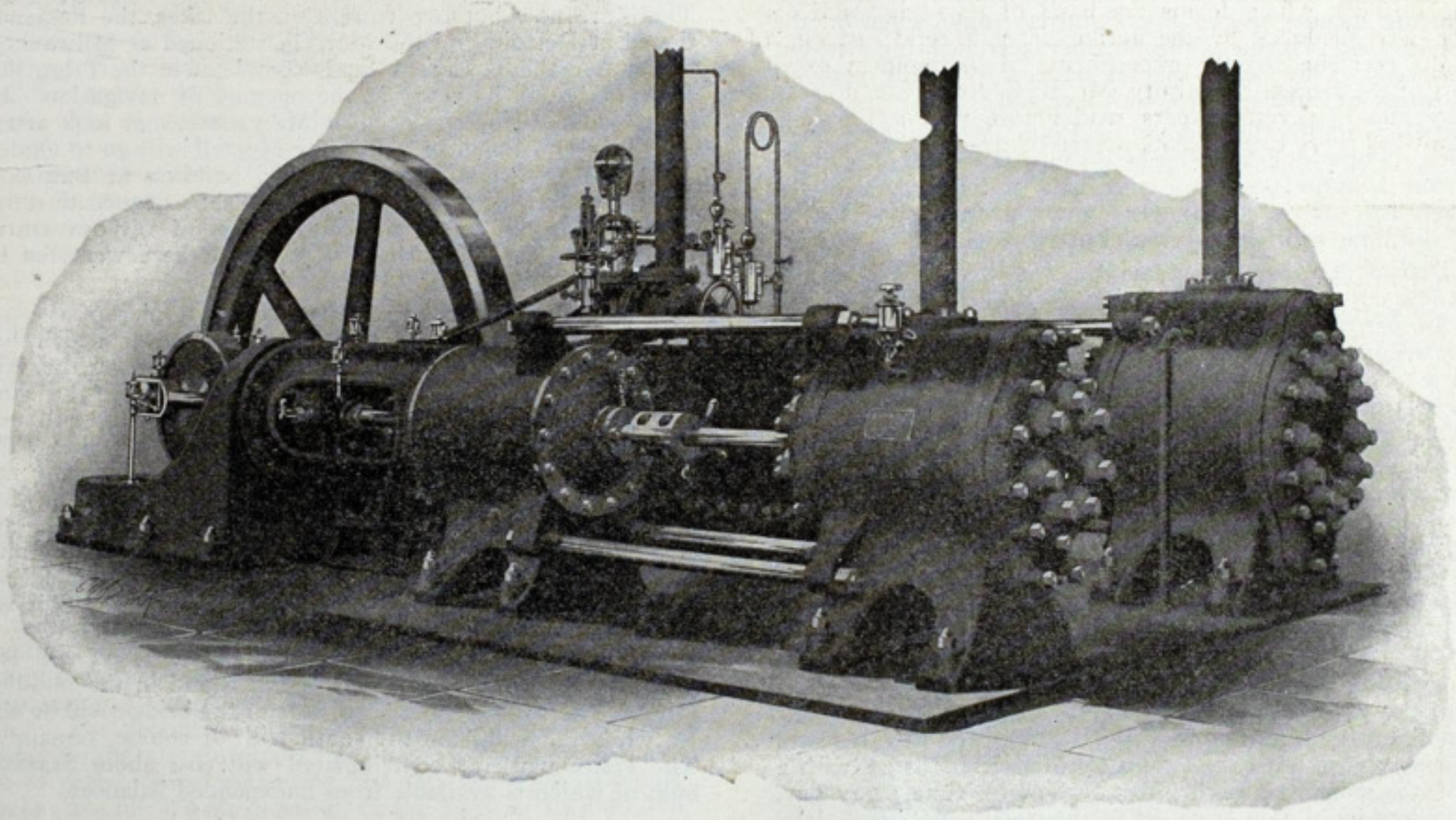
In design, the frames follow the most approved Corliss construction and are of exceptional strength to withstand extreme strains without producing mechanical distress. The steam and air cylinders are tied tandem to each other with heavy tie rods and are rigidly supported by a sole plate, which extends beneath all four cylinders. The pillow blocks have extra broad pedestals and all frames are planned perfectly true on the bottom, assuring a perfect alignment. All cylinders are of extra close grain iron, with appropriate thickness for reboring, and are bored absolutely true and parallel. Steam and air pistons are of solid type, cored hollow to avoid unnecessary weight, and are provided with snap rings of special iron carefully fitted to place. They have no followers or bolts, thus avoiding liability of accident. Stuffing boxes are of ample depth. Piston rods are of steel, turned true and polished.

The air cylinders and cylinder heads are thoroughly water-jacketed. Provision is made for a circulation of cold water the entire length of the cylinder, the water passing also through the heads, its cooling effect being especially concentrated around the discharge valves, which naturally sustain all of the heat due to compression and friction that has not been eliminated by the water jacket during the actual process of compression.

A novel feature, the value of which as a safeguard cannot be overestimated, is an outside water connection for conducting the circulation of water between air cylinder and cylinder head, excluding the possibility of serious accident through water entering the interior of cylinder should the gasket between cylinder and head become ineffective. The bearings are exceptionally large and well proportioned. The main bearings are provided with removable shell boxes and only the best phosphor bronze and genuine babbitt metal are used. All bearings are adjustable for wear, with ample provision for oiling. Steam valves are balanced slide valves, adjusted to realize the highest attainable economy in the consumption of steam and are provided with Meyer independent adjustable cut-off. All valves have provision for re-adjustment when required by wear.

The air inlet and discharge valves are of the poppet type, placed in the cylinder heads from the outside and immediately accessible for adjustment or repair without removing the cylinder heads. The valve, valve steam and head are forged in one piece, entirely avoiding the use of flange nuts, jam nuts, split pins or other contrivances intended to serve as a head for the steam, needing constant supervision, with continual liability to work loose. A feature of more than ordinary importance embodied in this valve is the fact that the valve seat is a part entirely separate from the cylinder proper and may be removed, replaced or renewed whenever occasion requires. In most forms of air compressors employing poppet valves, the valve seat forms an integral part of the cylinder head, affording no opportunity for renewal when it becomes worn. The valve and seat form a complete piece of mechanism which may be examined, re-ground and adjusted separate from the compressor. The valve seats are of bronze and the springs of steel, light enough to minimize resistance in opening, yet strong enough to promptly seat the valve in closing. The proportion of valve area to cylinder area is exceptionally liberal, enabling the cylinder to fill freely at each stroke, without volumetric loss or impaired efficiency due to the wire-drawing effect of insufficient valve area.

The cylinder flanges are recessed to effectually prevent the valves from falling into the cylinders, avoiding the necessity of a guard plate and the consequent clearance loss resulting from its use. The cranks are of disc pattern, made from best quality charcoal iron. Shafts and crank pins are forced to their places, the former being keyed and the latter riveted, especial care being exerted to have the shaft and pins absolutely parallel. Crank pins are of special ground steel. Crank shafts are of unusual strength, made from best hammered machinery steel, accurately turned and finished. Connecting rods are made from best forged steel, carefully finished. Boxes are adjustable for wear, and accord with the most approved practice in all classes of compressors. The guides are bored and crossheads are provided with babbitted shoes at the top and bottom with wedge adjustment for taking up wear. A combined speed and pressure regulating governor is provided, having a connection to the air receiver, and regulates the steam supply to the compressor to suit the air consumption, maintaining a constant unvaried air pressure, even though the demand be intermittent. Working in combination with this governor is a speed governor for regulating the speed of the engine.



The intercooler furnished with this type of compressor consists of a set of tubes encircled by a steel shell, into the heads of which the tubes are fitted, suitable provision being made for expansion and contraction? A constant circulation of cold water is maintained through the tubes, and the compressed air from the initial compressing cylinder enters the intercooler on one side and after thorough distribution and contact with the tubes discharges from the other side, passing to the next compressing stage. Adequate provision is made for readily cleaning the interior of the intercooler, and the tubes, being of composition metal, do not rust or become foul. In many forms of compound compressors the advantages to be derived from two-stage compression are not realized because of inadequate cooling surface in the intercooler, or because the air comes in contact with the cooling surfaces but once in passing through the intercooler.

Complete provision is made for automatic oiling, sight feed lubricators of ample capacity being furnished for steam and air cylinders, centrifugal oilers for crank pin bearings, and oil cups of approved pattern for all wearing parts. Steam and air cylinders have indicator connections, and indicator diagrams are taken under the exact working conditions.

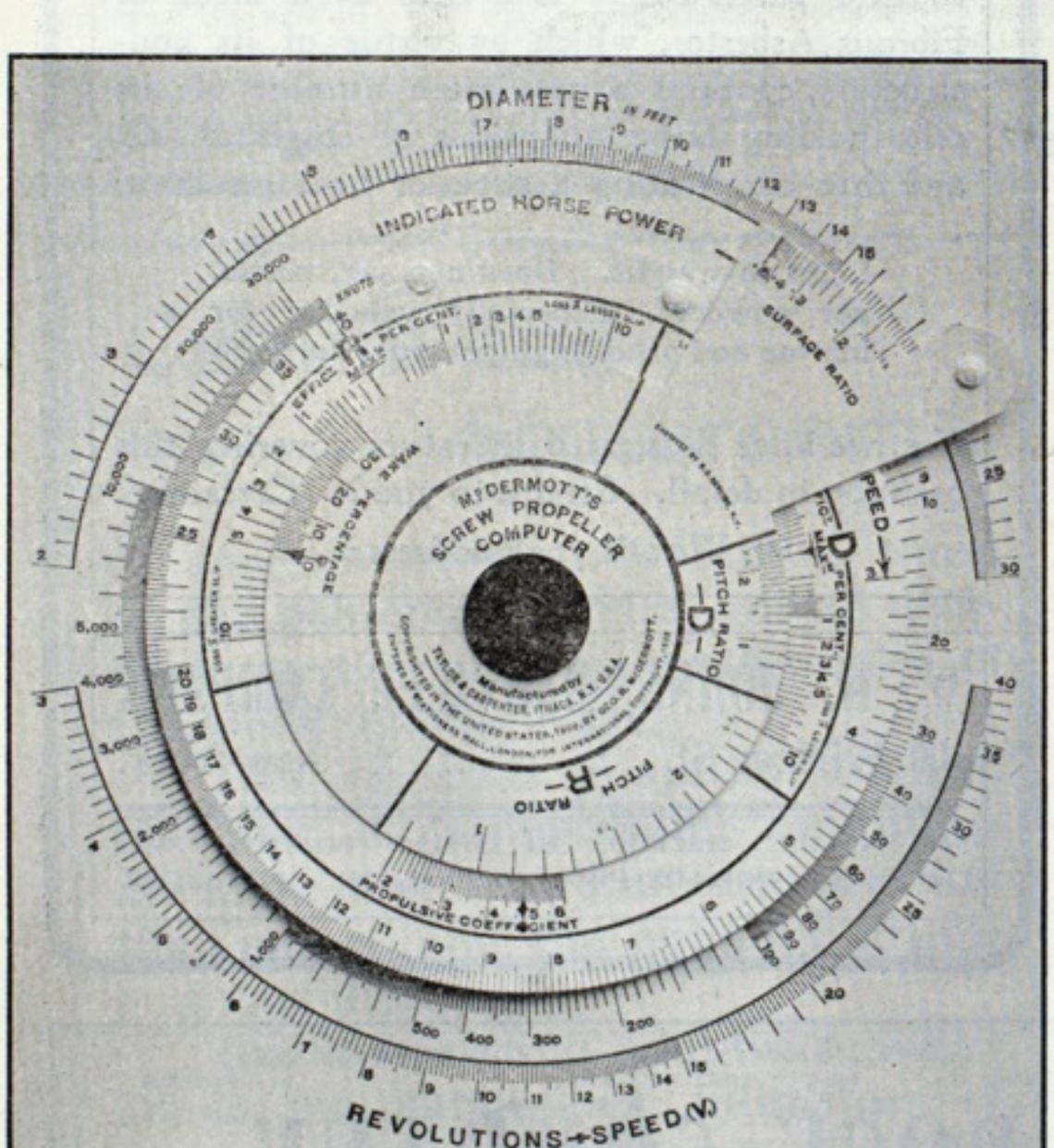
This type of compressor is built in three sizes ranging in capacity from 500 to 2,000 cu. ft. of free air per minute and is also built with simple steam cylinders, for plants where the

available steam pressure does not warrant compounding. Single and duplex compressors in a variety of sizes are also manufactured. Compressors of this type are in operation at the following plants: Advance Thresher Co., Battle Creek, Mich.; American Locomotive Co., Brooks Works, Dunkirk, N. Y.; Bessemer & Lake Erie Railroad Co. Greenville, Pa.; Big Four Railroad, Brightwood, Ind.; Commonwealth Steel Co., Granite City, Ill.; Lackawanna Railroad, Kingsland, N. J.; Lake Shore & Michigan Southern Railway Co., Collinwood, Ohio, two compressors; Louisville & Nashville Railway Co., New Decatur, Ala.; Mobile & Ohio Railroad Co., New York Central & Hudson River Railroad Co., four compressors; New York, New Haven & Hartford Railway Co., three compressors; New York, Ontario & Western Railroad Co., two compressors; Norfolk & Western Railway Co., Roanoke, Va.; Wm. B. Pollock Co., Youngstown, Ohio; John N. Robbins Co., Erie Basin ship yard, Brooklyn, N. Y.; St. Louis, Iron Mountain & Southern Railway; Simplex Railway Appliance Co., Hammond, Ind.; Terre Haute & Indianapolis Railroad Co., (Vandalia Line) Terre Haute, Ind.; United States navy yard, Boston, Mass., two compressors; United States navy yard, Norfolk, Va.; Portland Co., Portland, Me.

SCREW PROPELLER COMPUTER.

Geo. R. McDermott, professor of naval architecture at Cornell university, has devised what he calls a screw propeller computer, which is illustrated herewith. The illustration is about half the size of the instrument, which is composed of one stationary and two movable discs carrying suitable scales, accurately engraved. It is designed for the purpose of furnishing a means, whereby the dimensions and proportions of screw propellers—diameter, pitch, surface, revolutions, slip and efficiency—can be quickly and accurately determined for any given case or set of conditions.

The formulæ which forms the basis of its design and construction were deduced by the author from a rigid analysis of the results furnished by the experiments of the eminent experimentalist of the British Admiralty, Mr. R. E. Froude, and as published by him in several papers read before technical societies. The results of these experiments are recognized and used by the



best informed engineers and naval architects as standard practice, and the uniform success accruing from their application in the design of propellers, for all types of vessels, naval and mercantile, has proven beyond any doubt their reliability. The methods of application of the results of the experiments to everyday practice, are however, to a more or less extent, cumbersome and tedious, involving solutions of several equations, reference and cross reference to curves and mathematical tables, accompanied in many cases by a trial and error process more or less extended. For these Mr. McDermott's computer is substituted. It is claimed that its use will enable the designer to arrive at a solution of propeller problems in a small fraction of the time previously taken, the results being practically identical to those obtained by the use of Froud's formulæ, etc., or by the modifications of his methods proposed by several writers who have made them the basis of their writings on propulsion.

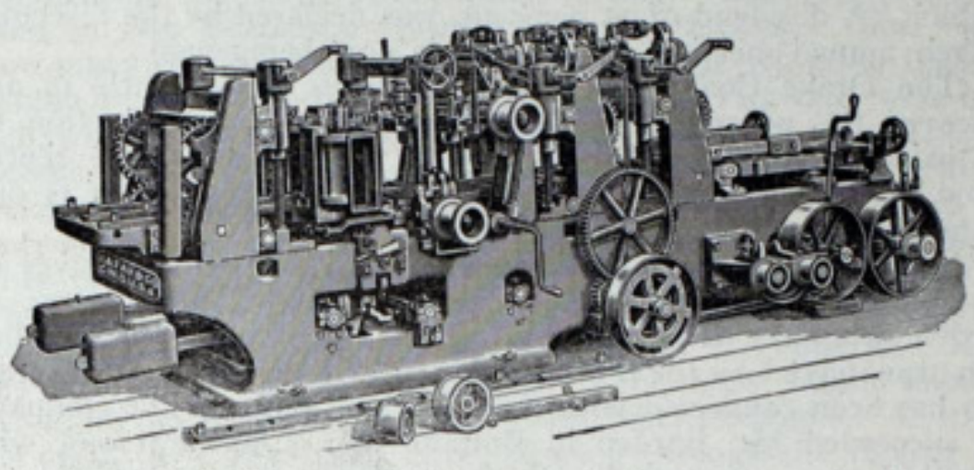
The use of the computer affords also advantages over that of formulæ, in that the effect on the dimensions, of changes in one or more of the related quantities is clearly shown, and may be obtained by mere inspection, thereby enabling the designer to come more quickly to a final and accurate decision as to the most suitable dimensions of propeller for any given case. In the analysis of the performance of propellers and ships the computer is also of value, giving at once the results sought, and which if calculated by the use of formulæ would involve a large expenditure of time and trouble.

Accompanying the computer is a short practical treatise dealing with the salient features of screw propulsion and of the quantities involved in the determination of the most suitable dimensions of screw propellers. The treatise includes information and tables not hitherto published.

The price of the computer and treatise is $5. It may be had from the Marine Review.

PLANER, MATCHER AND JOINER.

There is illustrated herewith a machine recently brought out by the large makers of wood working machinery, the J. A. Fay & Egan Co. of No. 325 to No. 345 West Front street, Cincinnati, O. It is called their No. 26 heavy, six-roll, double-cylinder planing,



matching and joining machine, patented Jan. 9 and Mar. 20, 1900.

This is the largest and heaviest combined planer and matcher they build, and is especially useful for car building and repair shops, and large lumber mills. It will plane to 30 in. wide and 14 in. thick, and will work simultaneously three sides of two pieces of material of uneven thickness up to 12 in. wide and 14 in. thick. The frame is massive, perfectly jointed and bolted to insure rigidity and freedom from vibration. The steel cylinders are slotted on all their faces and have chip breakers for working cross-grained or knotty lumber. The matching works are substantial and of improved construction, and are fitted with a patent weighted matcher clip producing an even pressure on the material. The feed works are very powerful, consisting of six powerfully driven rolls, easily raised and lowered and heavily weighted. The rolls are divided, have accurate adjustments, and are always kept in true alignment. The feed is steady and uniform, and its rate can be changed as desired. This machine will be found to possess many other devices for facilitating the work and making the adjustments, and if any of our readers are interested they can obtain further particulars, cuts and terms from the makers, who will also send free to those interested and who will write mentioning this paper, their new and complete catalogue.

PACIFIC MAIL LINER SIBERIA.

While the new mail steamer Siberia, one of the two big Pacific liners built by the Newport News Ship Building & Dry Dock Co., was thrown open for inspection in New York during the latter part of last week, Mr. F. Meriam Wheeler, manager of the marine department of the Geo. F. Blake Mfg. Co., took advantage of an invitation from the Pacific Mail Steamship Co. to show to friends of the Blake company the machinery of the ship generally and especially the Blake pumps. Mr. Wheeler's invitation met with response from a very large number of gentlemen interested in the machinery of ships and they were very well repaid for their visit to the Siberia on Friday last. The Siberia, like her sister ship the Korea, has a complete outfit of Blake pumps. Her displacement is 18,400 tons; length, 572½ ft.; beam, 63 ft.; depth, 40 ft.; draught, 27 ft.; total horse power, 19,000; maximum speed, 20 knots.

The Siberia and Korea are the largest-powered and fastest steamships that have been built for the Pacific ocean trade. Each vessel is equipped with two sets of quadruple expansion engines, each engine consisting of one 35-in. high, one 50-in. first-intermediate, one 70-in. second-intermediate, and one 100-in. low-pressure cylinder; length of stroke, 66 in.; steam pressure, 200 lbs. per square inch; revolutions, eighty-six per minute. There are six double-ended, and two single-ended Scotch boilers, having fifty-six furnaces, and a total grate surface of 1,070 sq. ft.; heating surface, 44,912 sq. ft. The bronze propellers have each three blades and are 19½ ft. in diameter. The surface condensers have a total cooling surface of about 23,600 sq. ft., and to each of these condensers is attached a Blake vertical, simplex, cross-compound, suction-valveless, double-acting air pump of the following dimensions: One 12-in. diameter high-pressure steam

cylinder; one 20-in. diameter low-pressure steam cylinder; two 24-in. diameter air cylinders; 18 in. stroke. The air pump is arranged with suitable connections, so that either side can be run separately, should occasion require. This feature is an important advantage, as it practically provides a spare pump. The time required to change from running both sides together, as a compound pump, to running one side as a simple machine, is less than one minute.

The other Blake pumps that complete the outfit for the Siberia are as follows: Four vertical simplex feed pumps; two vertical simplex heater lift pumps; two vertical simplex compound ballast pumps; two vertical simplex fresh water and brine distiller pumps; two vertical simplex evaporator feed pumps; two vertical simplex fresh water distiller pumps; one vertical simplex fire and ballast pump; two horizontal duplex fire and bilge pumps; two horizontal duplex sanitary pumps; one horizontal duplex donkey boiler feed pump; one horizontal compound duplex sanitary pump; two horizontal combined simplex air and circulating pumps for auxiliary condensers; one horizontal simplex crank-pit oil pump.

TRADE NOTES.

The Roberts Safety Water Tube Boiler Co., 39-41 Cortlandt street, New York, continues handsome dividends to its stockholders. A dividend of 15 per cent. was declared by the directors at their annual meeting Nov. 1 and is now being paid.

The Drake Coal Co.'s 1903 calendar is out—a little in advance of the procession of calendars. It is a reproduction of the painting entitled "Gossips" by J. G. Brown and is reproduced in the three-color process by the Osborne Co. It is one of the calendars that will be preserved.

Some changes have been made recently in representatives of the Chicago Pneumatic Tool Co. in this country. Mr. George A. Barden, who has been representing the company at Buffalo, has been transferred to the Philadelphia field and Mr. C. R. Green, who has been connected with the Cleveland office of the company has succeeded Mr. Barden in Buffalo. Mr. Chas. Parsons, who recently became connected with the company, is now traveling in the northwest.

The Leavitt Machine Co., Orange, Mass., sole manufacturers of the Morse and Dexter valve reseating machines, say of them that they are indispensable and are money saving outfits for repairing all flat and taper-seated valves and their disks from ¼ to 18 in. without disconnecting them from the pipes. Old valves that have been laid aside as worthless can be made as good as new eight or ten times. The United States navy highly endorses the use of these machines.

The DeForest Wireless Telegraph Co. report having shipped to the navy yard at Washington two complete outfits of their device, with which the government proposes to experiment between Annapolis and Washington, it being the intention, provided the tests are satisfactory, to place the device on government vessels. The company is also equipping forts Wadsworth and Hancock and the deep-sea fishing steamer J. S. Worden with apparatus for sending and receiving wireless messages.

The Atlas Car & Manufacturing Co. of Cleveland, has issued two catalogues. One shows a partial line of cars manufactured for use in and around brick yards and cement plants. The company does not confine itself to standard sizes but builds any style or size car to suit requirements. In the past few years the company has been adding vast improvements to dryer and clay cars and are now placing on the market the strongest and most durable car made. The second catalogue is devoted to some of the railroad equipment that the company manufactures, including cars, switches, frogs and points. Both catalogues will be sent to anyone interested.

The Carley Life Float Co. with offices at No. 4 and 5 Produce Exchange building, New York, has just issued a complete catalogue. The booklet is illustrated with half-tone plates from wash drawings and photos. It is printed in two colors. It contains a score or more press comments upon the life float from leading newspapers and magazines throughout the country, as well as opinions of such marine experts as Capts. Kilgore, Stodder and Maguire of the revenue cutter service, and many others who are competent to judge. It is understood that the factory at Cambridgeport, which has recently been enlarged, is taxed to the limit and many orders received now are for floats to be delivered in the spring.

Herreshoff & Wells, naval architects, 11 Broadway, New York, are building eight sailing race-about yachts for the Redbank Yacht Club. They are to be of 23 ft. 3 in. length, 18 in. water line and 7 ft. 3 in. beam, with 20 in. draught. Each boat is to carry 500 sq. ft. of sail. They are also building a 32-ft. non-capsizable, cruising knockabout of 8 ft. beam, 4 ft. 6 in. draught, and to carry 650 sq. ft. of canvas. The cockpit is arranged on the lifeboat plan, so that any water she might take will drain off immediately. At the works of the Holmes Ship Building Co., West Mystic, Conn., they have building a 36-ft. launch that is to be fitted with lavatory, ice box, closets, etc., and with sleeping accommodations for four persons, the intention being to make the boat the most complete craft of her class ever constructed.

U. S. Engineer Office, Milwaukee, Wis., Nov. 29, 1902. Sealed proposals for the purchase of U. S. Dredge No. 2 and steam tug 'Energy", will be received at this office until 12 noon, Dec. 15, 1902, and then publicly opened. Form for proposal and all information will be furnished on application to this office. J. G. WARREN, Major, Engrs. Dec. 11.

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POWER DISTRIBUTION IN THE CLYDE DISTRICT.

A bill has recently been sanctioned by parliament, which gives authority for an extensive power distribution scheme contemplating the supplying of power to the industrial region of the lower Clyde river in Scotland. The district covered by the bill includes that part of the Clyde valley extending about 10 miles on each side of the river and about 20 miles up and down stream from Glasgow. The area covered is about 700 square miles, and three generating stations will be erected to meet the demand for power. The scheme has been promoted by a group of manufacturers who desire to obtain cheap electrical power and who realize that this can be better done by joining in a common system than by each putting down his own generating plant. This is the busiest part of industrial Scotland and contains about 1,200 works, many of which are large iron and steel works, coal mines, ship building yards and chemical works. Some of these works will alone require more power than many of the local municipalities now provide for lighting purposes, and it was easily shown that it would be inadvisable for the separate boroughs to attempt to supply an amount of power involving so large an expenditure of capital. The three generating stations are to be built at Motherwell, Yoker and Crookston. The Motherwell station is located in the neighborhood of a large number of manufacturing works and in the center of an extensive coal field and can be connected with the adjoining line of the Caledonian railway. It is also in close proximity to the River Clyde, from which water for steam and condensing purposes can be obtained. The Yoker station is also situated on the Clyde, near the line of the Lanarkshire & Dumbartonshire railway, and is in close proximity to a large number of ship building yards and docks. Authority has been obtained to lay cables across the Clyde from Yoker to Renfrew, which will enable the works at Renfrew, and other works on the south side of the river, to be supplied from this station. The third generating station will be situated near Crookston on the Glasgow & Southwestern railway canal line, and owing to the arrangement allowing the company to cross the river it will not be necessary to construct this station immediately.

The works from which the most urgent demands for power have been received are situated in the areas immediately surrounding the first two sites and it is intended, therefore, to proceed with these stations first and to install in each a plant of about 4,500-Kw. capacity. They will be so designed that they can be enlarged from time to time, as the demand requires. A radius of 14 miles from these stations covers practically the whole district in which the company will be allowed to distribute their power, but a large proportion of the works are located within a radius of 6 or 7 miles of the stations. When the stations are in operation, they will probably be coupled together electrically, enabling them to share the loads and average up their power factors or to supplement or aid each other in any emergency. The capacities of the respective stations will ultimately be about 10,000 K. W. each at Motherwell and Yoker, and 5,000 at Crookston.

The authorized capital of the Clyde Valley Electrical Power Co. is $4,500,000, with borrowing powers of $1,500,000. The total cost for plant on the transmission lines is estimated at over $2,000,000. The electrical apparatus, which will comprise polyphase alternating-current generators and transformers for high voltage power distribution, rotary converters for the supplying of direct current, etc., has been contracted for with the British Westinghouse Electric & Mfg. Co. Messrs. Strain & Robertson are the engineers of the Clyde Valley Electrical Power Co. Mr. Robt. Robertson has recently spent a considerable period in the United States investigating systems and methods of power transmission and distribution, particularly in the large cities and in such localities as Niagara, Snoqualmie Falls, Wash., Canyon Ferry, Mont., and other places.

AMERICAN MARU IN A TYPHOON.

Storm-racked and scarred, with her superstructure smashed and broken, the Toyo Kisen Kaisha's liner American Maru arrived in San Francisco recently from the Orient. The vessel bore many marks attesting the violence of the whizzing typhoon against which she battled in the China seas. Her rails were bent and twisted and the side of the hospital was stove in. The experience of the American Maru in the typhoon is almost without precedent. Caught in the grip of the revolving wind storm she forced her way into the vortex and passed through the center, where a dead calm prevailed. Few ocean travelers have lived to relate the unusual experience of passing through the very heart of the typhoon. The whirling cyclone caught the American Maru one day after leaving Yokohama. The blow began about 2 o'clock in the afternoon and lasted until after midnight. It struck the vessel with hurricane force, blowing through the rigging and tearing at the superstructure. Seas broke on board fore and aft, sweeping the decks and flooding the steerage, with 700 Asiatics huddled together in great fear. A Japanese bathroom steward was caught by the flood and dashed with terrific force against the iron deck. He died instantly. The storm passed, and the American Maru lay tossing upon a troubled sea in a perfect calm, while the typhoon surrounded her like a towering wall. Then the vessel was again caught up in the maelstrom, and for a second time the inmates of the steerage were drenched. The steam steering gear was carried away, adding to the danger. For a time Capt. Going steered with the twin screws, and then the hand steering gear was resorted to.

The De Haven Manufacturing Co., Brooklyn, N. Y., has issued a postal card of enormous dimensions to the effect that De Haven's trojan bale tie is 30 per cent. cheaper than rope. It is a very striking ad.

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SHIP YARD NOTES.

The navy department will call for bids for two gunboats early in December.

John H. Dialogue & Son, Camden, N. J., launched the steam ship Lewis Luckenbach on Saturday last.

A barge building at the Bath Iron Works for the J. M. Guffey Petroleum Co. of Philadelphia, will bear the name of Shenango. She will hail from Philadelphia and will run on the Galveston-Philadelphia route.

Cobb, Butler & Co., Rockland, Me., are to build for Capt. I. E. Archibald, a wooden steamer of the following dimensions: Length, 145 ft.; beam 27 ft.; depth, 11 ft. Work will be begun upon the new vessel at once.

The Neafie & Levy Ship & Engine Building Co., Philadelphia, Pa., has closed a contract with the Philadelphia & Reading Railway Co. for a steel sidewheel ferry boat of the following dimensions: Length, 156 ft.; beam 30 ft.; depth 13 ft.

The Eastern Ship Building Co., New London, Conn., is desirous of completing the Great Northern liners as speedily as possible and for this reason has decided to operate the plant on Sundays. For nine hours work on Sunday the workmen are to receive fifteen hours pay.

A four-masted wooden schooner, the Stanley H. Minor, was launched last Saturday from the yard of Eben Haggett at Damasiscotta. She is 209 ft. long over all, 180 ft. keel, 36 ft. beam and 13½ ft. deep. She will be equipped with a steam capstan and windlass and other labor-saving devices.

The three-masted wooden now ready for launching at Cobb, Butler & Co's. yard, Rockland Me. has been sold to the firm of Walter Barnes & Co., Ltd., Manila. This firm conducts a considerable hemp business in the Philippines. This schooner will be the first American sailing vessel built for Philippine account.

A four-masted wooden schooner, the Robert H. Stevenson, was launched from the yard of the New England Ship Building Co. last week. She is 180 ft. keel, 40 ft. beam and 18 ft. deep. As noted, she is a very deep craft for her breadth, which is one thing that causes her carrying capacity to be so large, being nearly 2,000 tons.

The Gas Engine & Power Co. and Charles S. Seabury & Co., Consolidated, Morris Heights, N. Y., are very busy on yacht construction. Among the vessels under way is the 165-ft. steel yacht Aria for Edward H. Blake of Bangor, Me.; a 115-ft. composite steam yacht for S. H. Vandergrift of Pittsburg; a 100-ft. steam yacht for J. Adolph Mollenhauer of New York; a 110-ft. steam yacht for S. Parker Bremer of Boston; a steam yacht of 103 ft. length, the Inia, for Henry S. F. Davis of New York; an 87-ft. auxiliary cruising yawl for J. H. Smedley of Detroit, and a 65-ft. steam launch for use on Lake George.

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The "Messageries Maritimes" Company	87,600 "
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WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.

TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.

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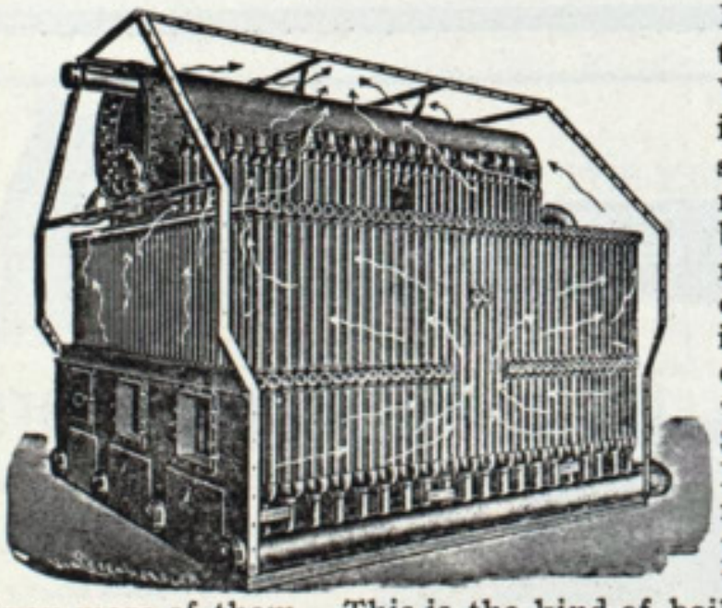

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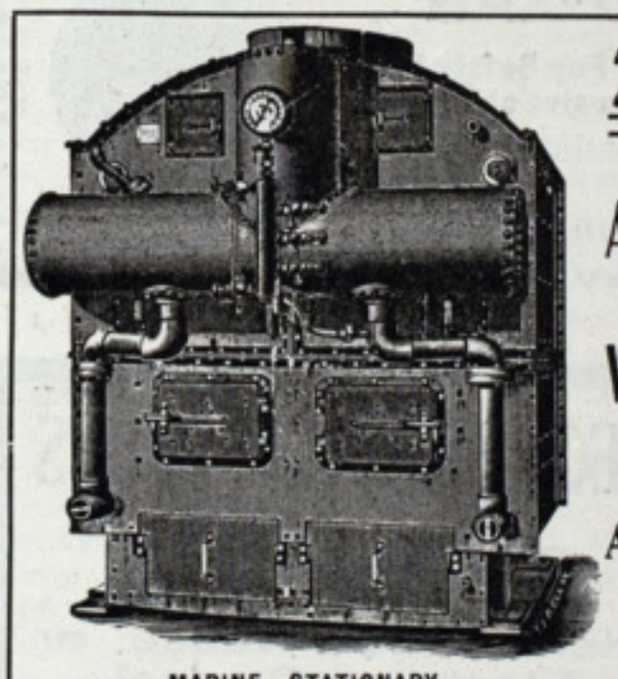

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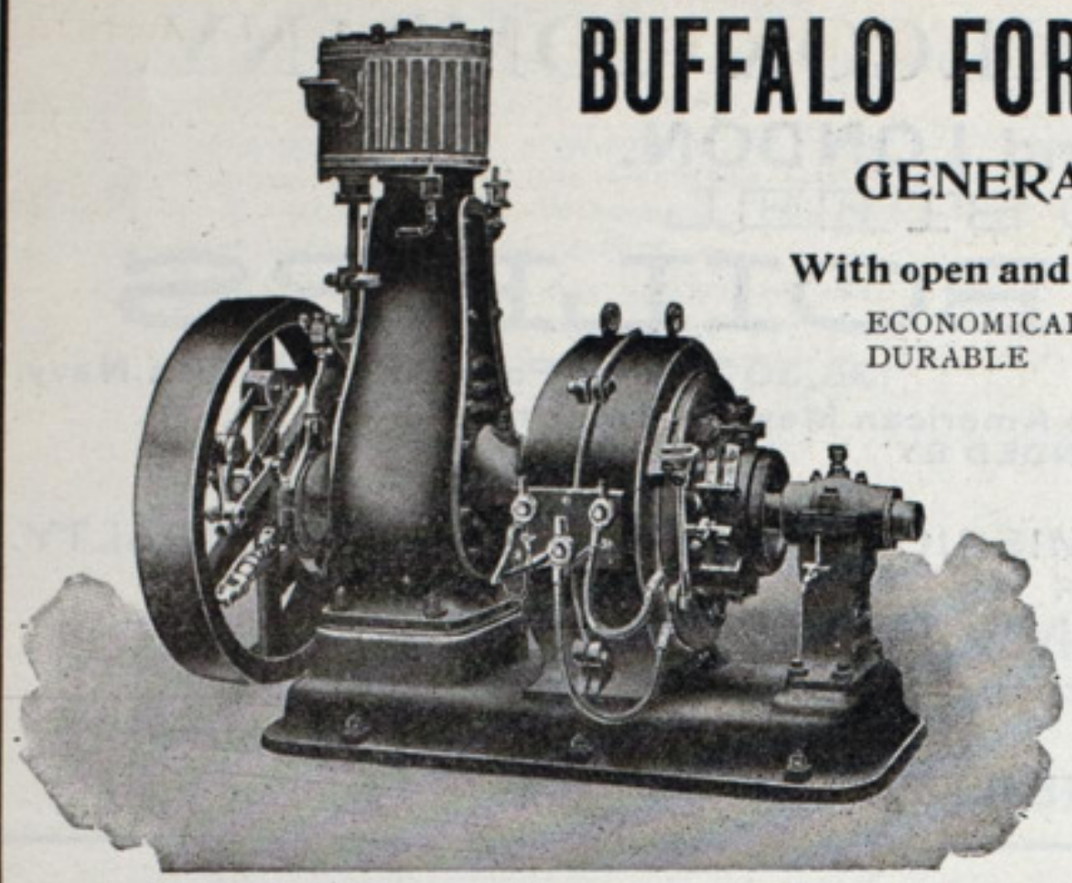

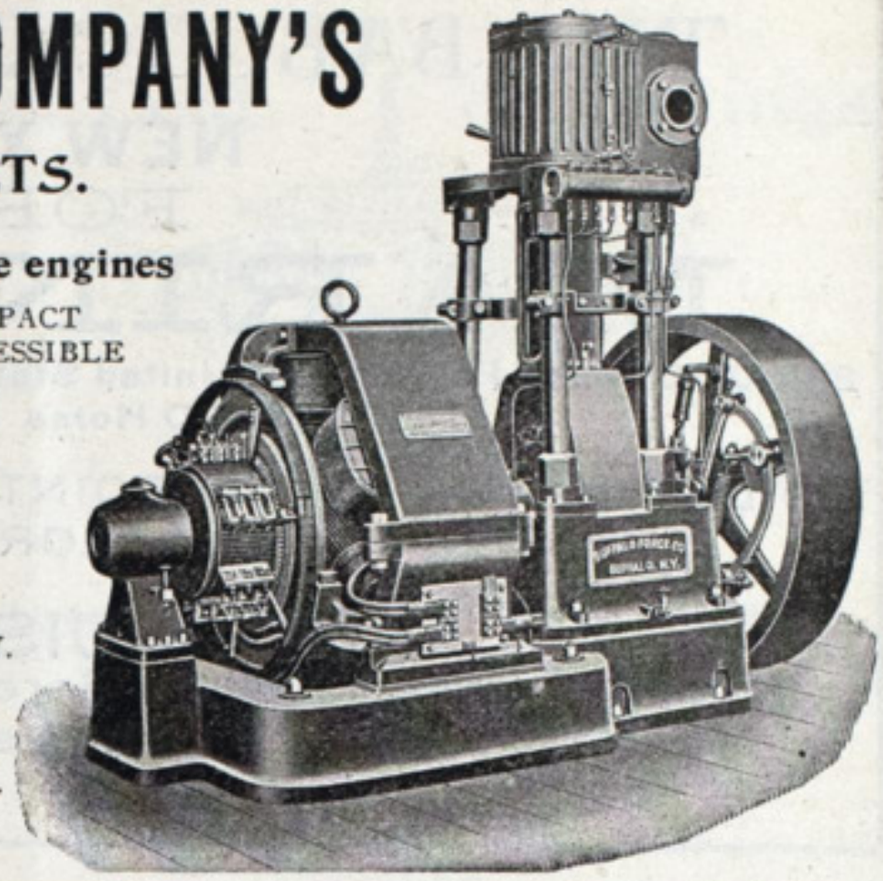

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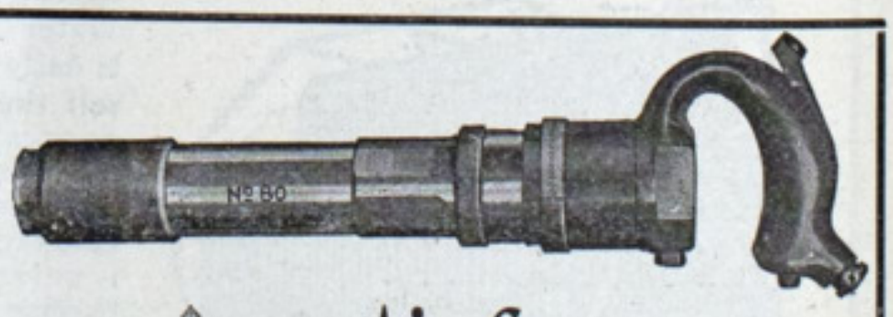

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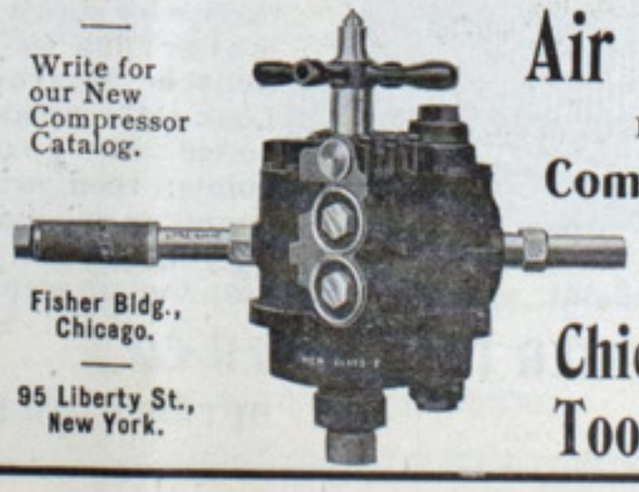

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